

NOVEMBER 1954 2/6

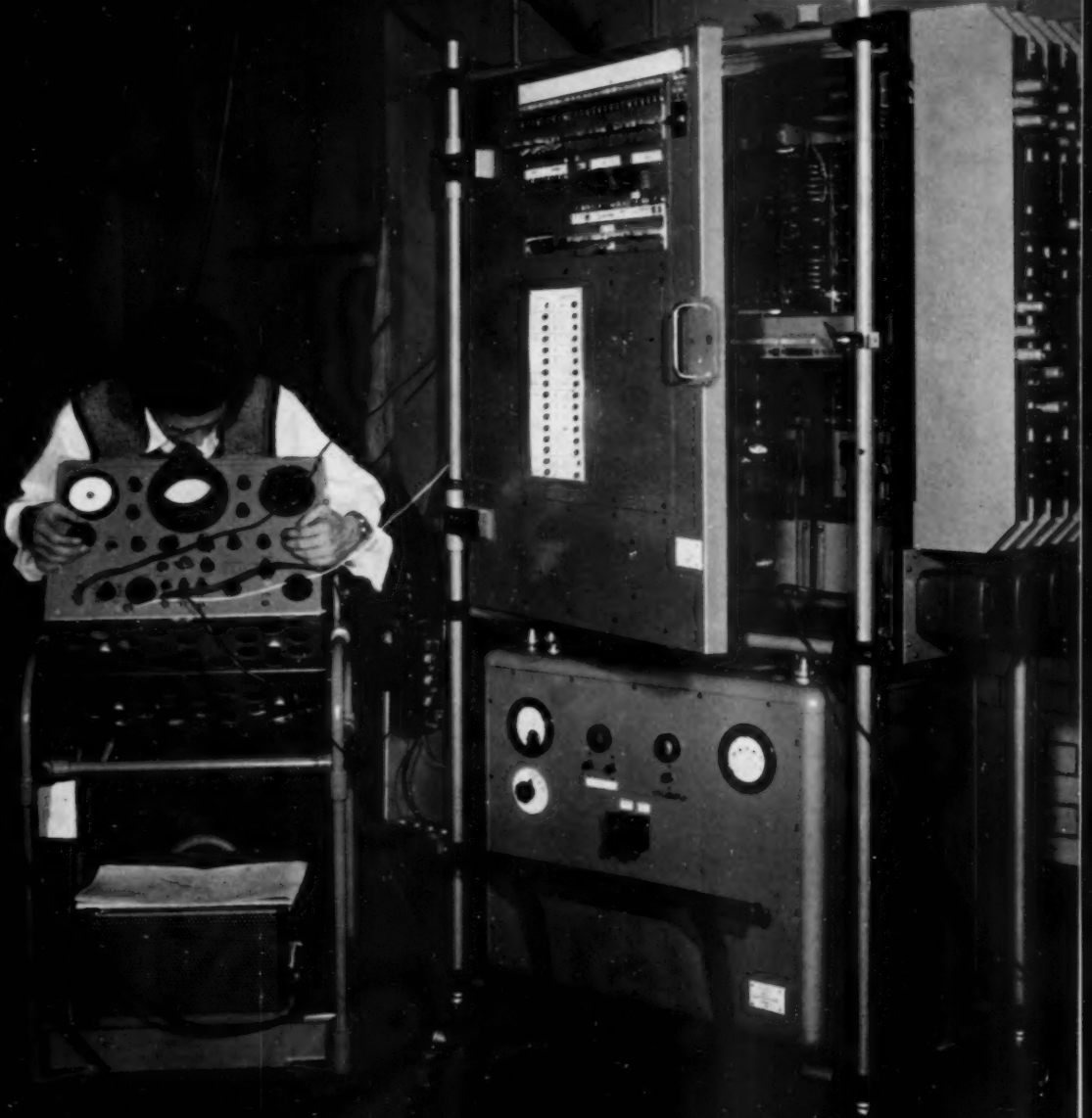
Business

THE JOURNAL OF MANAGEMENT IN INDUSTRY

ELECTRONICS in the OFFICE

A Special Survey

Page 73



FOR NEW IDEAS *



ON OFFICE COPYING

Is everyone in your business adequately briefed on his job? Does everyone get copies of letters, reports, memoranda, affecting his work? Are these copies accurate? Do they

add too much to your typing costs? The Man from Remington Rand will be glad to analyse your office copying needs, and prescribe the equipment to meet them.

* THIS IS REMFLEX

It makes an accurate, positive copy—of anything written, typed or drawn—in less than two minutes, at much less than copy-typing cost. Any office junior can use and

maintain Remflex, in any office corner. It provides a copying service that is completely reliable and can't make mistakes. Does Remflex sound the answer to your copying problems? Let us prove that it is:

Send for the Man from
Remington Rand

• **COUPON:** I would like to know more about Remflex. Please * arrange for your representative to call by appointment ☐ * send me free informative literature ☐ (tick course of action required)

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• **ADDRESS**

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OM 14



You Pay Your Staff

For Working-Not Walking!

Walking is a dead loss of man hours in business. Efficient intercommunication saves miles of walking. RELIANCE TELEPHONE SYSTEMS put everyone at everybody's elbow... no walking; no waiting. A flick of a switch, nothing more, gives instant intercommunication. Take the first step towards lowering your staff costs and start saving everybody's time now. Write to-day for leaflet B2/16.

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INTERNAL TELEPHONES STAFF LOCATION MUSIC FOR INDUSTRY

NOVEMBER, 1954

Business

JOURNAL OF MANAGEMENT IN INDUSTRY

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economic supplement

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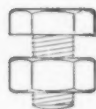
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Change of subscriber's address: Please notify Publishers six weeks before change of address is to take effect, giving present address in full and new address. BUSINESS, Vol. 84, No. 11 (incorporating "The Magazine of Commerce," "Modern Business," "System," "Business Organization and Management," "Business News Digest" and "British Industrial Equipment"). Published monthly by Business Publications Ltd., 180 Fleet Street, London E.C.4. CHANCERY 8844. 30/- a year post free U.K. & Eire; 35/- Overseas.



make it exactly how you want it

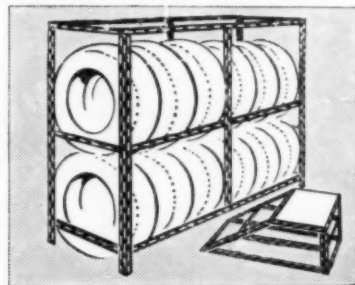
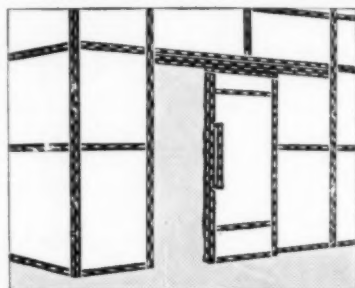
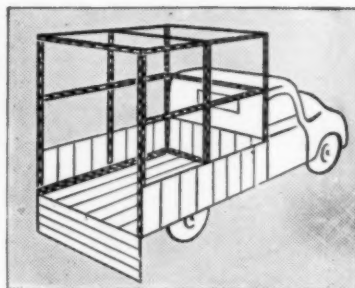


WITH STONEHOUSE SLOTTED ANGLE

So you want a work bench, or a ladder, a goods truck, a shed or racks for storing awkward components in awkward shaped places. Well . . . use Stonehouse Slotted Angle and build them yourself. It's quicker and cheaper *and you can make the products exactly as you want them.* You need no detailed drawings. You just count the slots, cut to the lengths needed and bolt your framework together. We supply bolts, shelving, hinges and castors to make up the complete range. You get exactly what you want, quickly, cheaply and it lasts you for many, many years.

TRIAL PACKAGE £6.17.6 Try out Stonehouse Slotted Angle with the low price trial package. 100 ft. of 3" x 1½" 14 gauge steel angle in 10 ft. lengths with 75 cadmium plated nuts and bolts. Red oxide finish—£6.17.6 (1/4d. per ft.). Battleship grey finish—£7.1.8 (1/5d. per ft.). Send to-day for leaflet and name of nearest stockist.

STONEHOUSE ALSO MAKE *top quality pallets, storage racks, bins, cupboards, lockers in heavy gauge steel with a first class finish—phosphated and paint stoved-on.*



WE STILL NEED STOCKISTS IN CERTAIN AREAS—PLEASE WRITE FOR DETAILS

STONEHOUSE STEEL EQUIPMENT LIMITED, DEPARTMENT 3, ROFTEN WORKS, HOOTON, CHESHIRE

On the Chairman's desk at Ransomes and Rapier



The Right Honourable Richard Stokes, M.C., P.C. M.P., is also Chairman and Managing Director of the famous engineering firm of Ransomes and Rapier Ltd. On his desk you will see signs of the busy life he leads: a scale model of his firm's new Walking Dragline and his Dictaphone Time-Master dictating machine.

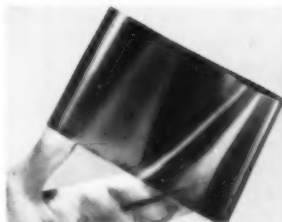
ON THE DESKS of men of the calibre of Mr. Richard Stokes — men whose business lives are full and successful — this trim little dictating machine, the Dictaphone Time-Master, is often to be found.

Their time is precious . . . The Dictaphone Time-Master saves time. Their ideas are more valuable still: the Time-Master records them instantly.

It is as simple to use as your tele-

phone. Yet, as thousands of business men have found, it can double your capacity to get things done. Indeed, old-fashioned methods of dictation may well be robbing your business of many thousands of productive hours.

Why not try the amazing Dictaphone Time-Master dictating machine on your own desk? Without obligation, of course. Telephone or post the coupon to-day for a free trial.



Plastic Dictabelt records are the "inside secret" of the Dictaphone Time-Master. Each one takes 15 minutes dictation, folds flat, can be mailed, filed.

DICTAPHONE TIME-MASTER

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London, W.1.
Hyde Park 9461

I would like to try the Dictaphone Time-Master. Please arrange a demonstration for me

NAME COMPANY

ADDRESS

NOVEMBER, 1954

Even DEXION Slotted Angle could be improved —now it *has* been!



New DEXION 225

**Lighter and cheaper, yet stronger, more adaptable
—and fully interchangeable with existing DEXION**

Good news for the 30,000 firms already using Dexion Slotted Angle to build their own equipment! And another reason for those who aren't yet using it to find out what they're missing.

Briefly, the new Dexion 225 Slotted Angle is *smaller* than the old —2½" x 1½" instead of 3" x 1½". That makes it lighter, and up to 15% *cheaper* (depending on quantity). The price of 100 ft., for instance, is now

reduced from £7.10.0 to £7.1.8.

But this saving means no sacrifice —quite the reverse. The new section is actually *stronger*. It is not just another pattern of slots; it has been engineered in detail — every dimension accurately designed for a specific purpose. Lengths can be overlapped, spliced, nested for extra strength if needed. Holes give positive, all-round bearing to bolts, for stronger joints at any angle.

SYSTEM UNCHANGED... ONLY MORE EFFICIENT

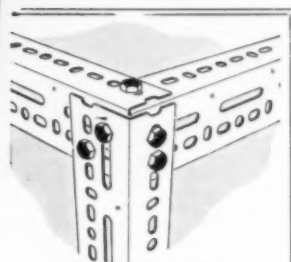
The new Dexion is fully interchangeable with the old — can be used with existing stocks. It simply makes it easier and even more economical to build the racks, benches, stands, trolleys, and other equipment for which Dexion is the perfect material — structures large or small, whether temporary or permanent.

Get the facts now. Send for details, sample piece of the new Dexion, and booklet M.5 showing many examples of Dexion in use. Dexion Ltd., Triumph House, 189 Regent Street, London, W.1.

NEW

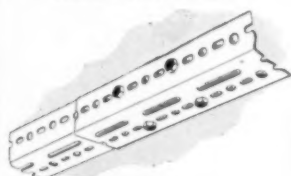
DEXION

225 SLOTTED ANGLE



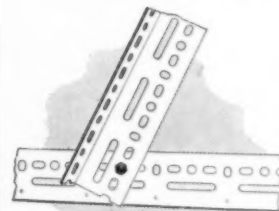
3-WAY CORNER

plain or interlocked, held rigid by bolts fitted in round holes.



OVERLAPPED JOINT

now possible, rigidly fixed by bolts in the transverse slot-holes.



ANGLE JOINTS

in braced structures now positively held by bolt through holes giving bearing in all directions.

THE CASE OF THE 15 BOTTLENECKS



Are your floors soaking up money?



DO YOU KNOW how much it costs to maintain your floors? More important still, do you know that in all probability that cost could be cut by as much as 50%? And when you consider that 95% of floor maintenance costs goes in labour, you'll realise what a 50% saving can mean. S. C. Johnson & Son will be delighted to demonstrate how this saving can be effected, without any addition to your present staff or equipment. Johnson's have spent well over half a century in research on heavy duty maintenance materials. How well they have succeeded is reflected in the fact that they are today the world's largest producers of polishing and maintenance

materials.

Johnson's Traffic Waxes comprise a whole range of waxes for all types of flooring. Waxes, that because they are easy to apply, easier to polish—and last so much longer, will cut labour costs by as much as 50%. That, you will agree is a saving that's worth investigating.

Ask your maintenance man to see the Johnson's man next time he calls—it may mean a very considerable saving to your Company.

The Johnson booklet "How to Care for Your Floors" is available free to buyers and "maintenance men" on application to Dept. B11 at the address below.

MAINTENANCE DIVISION

S. C. JOHNSON & SON LTD • WEST DRAYTON • MIDDLESEX

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believe it or not!



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TELEVOICewriter System for the
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This is a Translucency

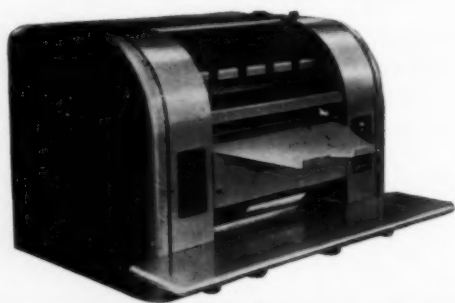
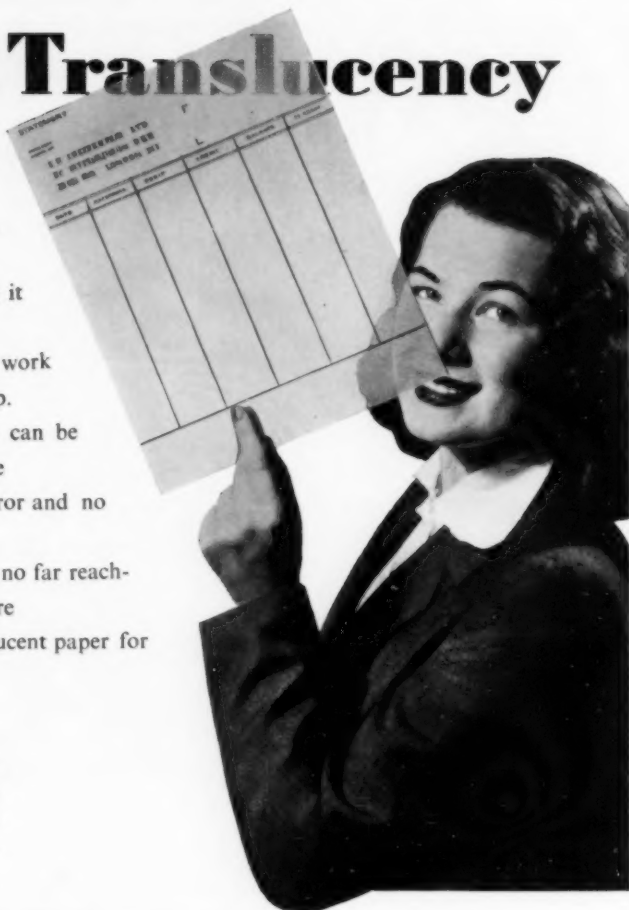
. . . . a paper that allows light to pass through it.

It's just as easy to type or write on, read and handle as normal opaque (light stopping) paper and, by using it with the OZAMINOR—Ozalid's latest copying unit—the flow of paper work in every department will be speeded up.

Statements and remittance advices can be produced up to a rate of 400* or more an hour, without any possibility of error and no checking is required.

The applications are unlimited and no far reaching alteration in your present procedure is necessary—simply change to Translucent paper for all your office forms.

** Where higher production is required we have other machines which produce over 2,000 copies per hour.*



The OZAMINOR, the latest addition to the wide range of Ozalid copying equipment, is the only machine of its kind manufactured outside the U.S.A. Positive, dry copies costing less than a penny each can be produced continuously from single-sided translucent originals. The OZAMINOR, which is streamlined and compact, can be operated on any small table and requires no skill whatsoever on the part of the operator. This equipment is the complete answer to the rapidly expanding use of office systems based on direct copies from translucent originals.

OZARAPID

REC'D

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BUSINESS



The largest item in Costs is usually Direct Labour—and the largest error is the inaccuracy of the Job Times.

No wonder Cost Accountants often find their Works Managers sceptical about the value of Job Costing!

Consider what happens. A Job is started at 8.07 and finished at 8.38 (Job Time: 31 mins). The next Job is started at 8.46 and finished at 9.21 (Job Time: 35 mins). When the Times are written on the Job Sheet by hand they appear, of course, as:

Job No. 1. 8.00 to 8.45 (45 mins)
Job No. 2. 8.45 to 9.30 (45 mins)

Nobody can stop that happening, **except by installing BLICK Job Times.**

But if there is a Job Card for each job and the jobs are clocked "On" and "Off" on a BLICK Time Recorder specially designed for Job Costing, three things happen:

- The Cost Accounts become a lot more accurate
- Idle Time comes to light
- Production goes up

Why not write to BLICK for full particulars of the BLICK range of Portable "Job Timers."

As well as "Job Timers" BLICK have a wide range of Time Control equipment suitable for both large and small businesses.

- Time Recorders for clocking both Factory and Office workers (a wide range of models to suit all conditions)
- Time Stamps for stamping forms, etc.
- Watchman's Clocks
- Sound Signal Systems (Bells, Buzzers, Hooters, etc., automatically set to sound at pre-determined times)
- Staff Location Systems (for finding executives not at their desks)

BLICK'S 7,000 users range from large numbers of "household names"—I.C.I., Shell, Rolls-Royce, B.T.H., Ford and so on—to thousands of very small firms employing less than a dozen workers.



When you consult BLICK you can be sure of receiving expert, careful and courteous attention—that is an integral part of the BLICK service. That is why so many of the largest and more efficient organisations consult BLICK.

And that is why you should...

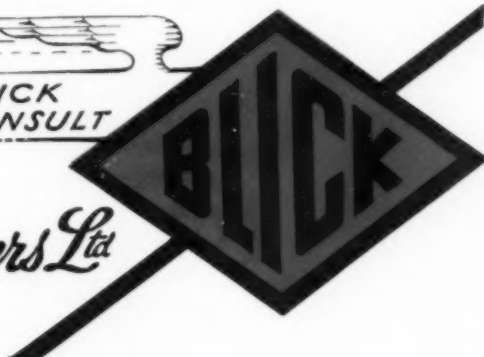
**BE QUICK
AND CONSULT**

- BLICK EQUIPMENT can also be Rented.

Blick Time Recorders Ltd

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Telephone: MONarch 6256/8



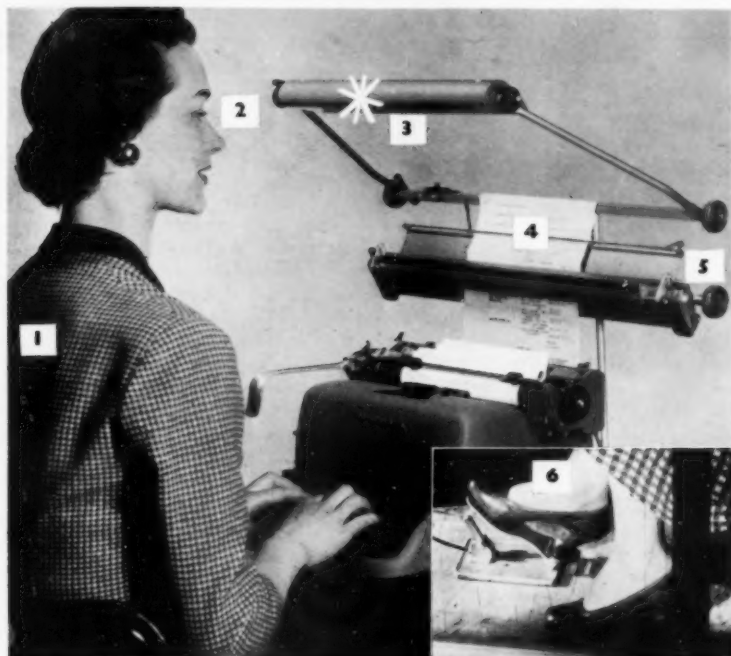
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for
everyone*



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Good
Companion
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CR19

The *LINDICATOR* MAJOR *COPYHOLDER*



1 POSTURE. No slouching, no twisting . . . Your Lindicator ensures that you sit naturally, comfortably, correctly.

2 VISION. Frontal reading, with copy at the perfect angle, means faster work without eye-strain.

3 LIGHTING. No glare, no shadow . . . the perfectly focused "Copy-lite" is the clearest and kindest light ever devised.

4 PREVIEW. No maddening mistakes. Dual line indication gives clear warning of coming copy amendments.

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6 CONTROL. A flick of the finger (or a touch of the toe) and your copy moves up a line at a time.

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The Lindicator System is the result of scientific study of the human and mechanical problems involved in copy-reading. Its outstanding success is proved by the very large number of famous businesses and official organisations in which it is now established as standard practice.



P.S.—Yes, the "Copy-lite" came as a post-script to the Lindicator . . . the final touch of scientific perfection. But remember—"Copy-lite" can be supplied separately and fitted to any model in a second. Test it—at our expense. You'll keep it—in your own interest.



Patentees and Manufacturers: **LINDICATION LIMITED,**
HONG KONG WORKS, EXHIBITION GROUNDS,
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Phone: WEMbley 4126

NOVEMBER, 1954



SHORTHAND is read more quickly and more easily when the note-book is held by a Lindicator Minor. Inexpensive, even with its "Copy-lite" attachment, the smallest Lindicator of all has everything except automatic copy control.



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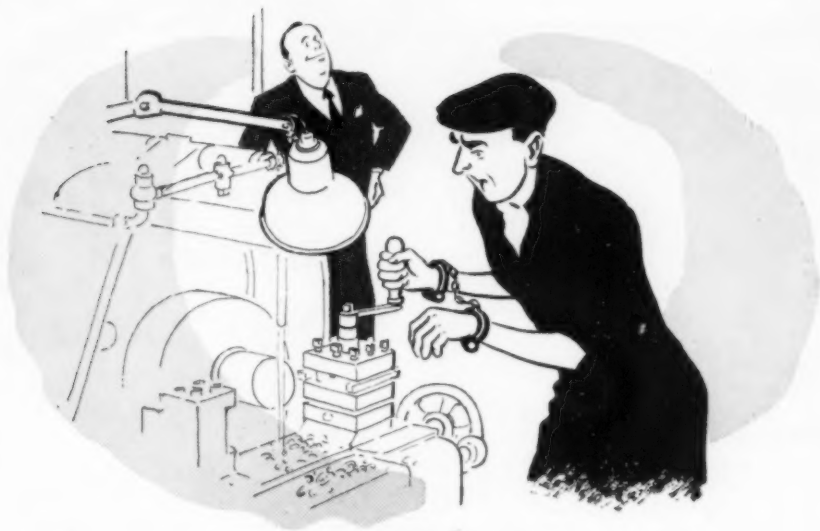


Just one of the ways in which

Kalamazoo

serves Industry, Commerce and Public Administration

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How to arrest Production

You need not use handcuffs to put a brake on production. Physical and Mental effort is being slowed down quite effectively in thousands of factories in a less spectacular, though equally efficient manner.

In nearly every factory and workshop where paint is used in the old traditional way production suffers as a consequence !

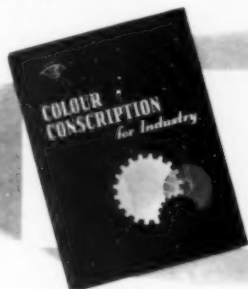
Do we suggest, then, that paint can be used to improve production ?

Not only can it be so used ; it is being used with that result by leading organisations.

Our Handbook "*Colour Conscription for Industry*" shows how colour can be employed to make *seeing* easier at the workbench ; its effect upon output ; how it may be used to combat fatigue ; its influence upon absenteeism.

"Colour Conscription" has been written for the busy executive who wishes to obtain a quick understanding of the simple principles involved ; it can be read in half an hour ; it is well illustrated. It will help you.

A complimentary copy will be forwarded to principals on request.



Production up 10%

Absenteeism down 50%

Such is the record of a well-known foundry after applying the principles described in "Colour Conscription."

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MANY manufacturers, subject to a kV.A max. demand tariff or P.F. penalty clause, have been able to save 18% to 35% of their power costs — without expensive plant alteration or economies in production.

An outstanding instance was that of a paper board mill where a necessary plant extension involved either a capital outlay of £36,000 or an additional annual expenditure of £18,000 on electric current. Actually, the result was finally achieved at a total cost of only £3,000.

How was it done? Power Factor correction by T.C.C. was the answer. No matter how large or small the factory, a saving can be guaranteed. If you would know more about this money-saving scheme that pays for itself in 12 to 18 months, write for the two free non-technical booklets "More for your Money" and "The Evidence". They will convince you that a T.C.C. engineer can show you how to cut your bills and make electricity really work for you.

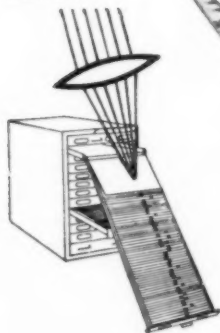
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visible recording

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Regd. Trade Mark

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Please send, without obligation, details of
Constructors Seldex Visible Recording Systems for
use in _____ Dept.,
and a copy of "Seldex, how it works."

Name _____

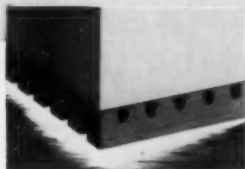
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NEOPRENE'S SUPERIOR PROPERTIES mean outstanding service in resilient parts and products

LOW COMPRESSION SET

Vibration pad of neoprene resists permanent distortion . . . retains its resiliency through a long service life.



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Air hose with a neoprene cover has unexcelled resistance to sunlight and weathering—even in continuous outdoor service.



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Conveyor belts of neoprene exhibit excellent heat resistance. Heat won't soften neoprene . . . won't make it tacky or gummy.



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Mining cables made with neoprene withstand abrasion, cutting and chipping in rugged service . . . will not propagate flame.



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V-belts stand up under constant flexing when made with neoprene. Belts resist deterioration from oils, grease and most solvents.



NEOPRENE

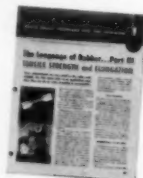
The rubber made by Du Pont since 1932



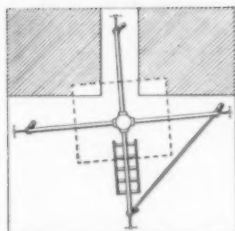
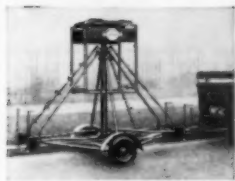
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... THROUGH CHEMISTRY

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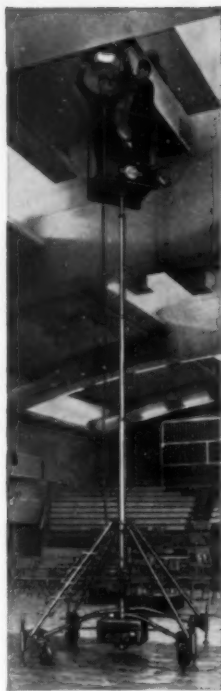
THIS WAY UP!



Above shows how "Beanstalk" (1) folds for passing through doorways, (2) can be trailer mounted, (3) gives close access with one leg of base placed in narrow recess between fixed objects.



The "Giraffe" is now standard equipment at many airports for servicing aircraft such as the Beverly, Boeing, Britannia, Canberra, Comet, Constellation, Dove, Javelin, S23 and S30 Flying Boats, Viscount, Victor, Valiant and York.



Up in seconds, the "Beanstalk" provides a quick and easy answer to the problem of getting at work overhead. Ideal for building maintenance and electrical installation work.



Remember this "flying spanner" symbol - the mark that means the most efficient answer to every problem of reaching work overhead.

The GIRAFFE Regd.

Hand or power operated through a hydraulic ram, the "Giraffe" provides comfortable and secure access up to working heights of 42-ft., reaching over, under or level with work in hand.

Cheaper access to overhead jobs

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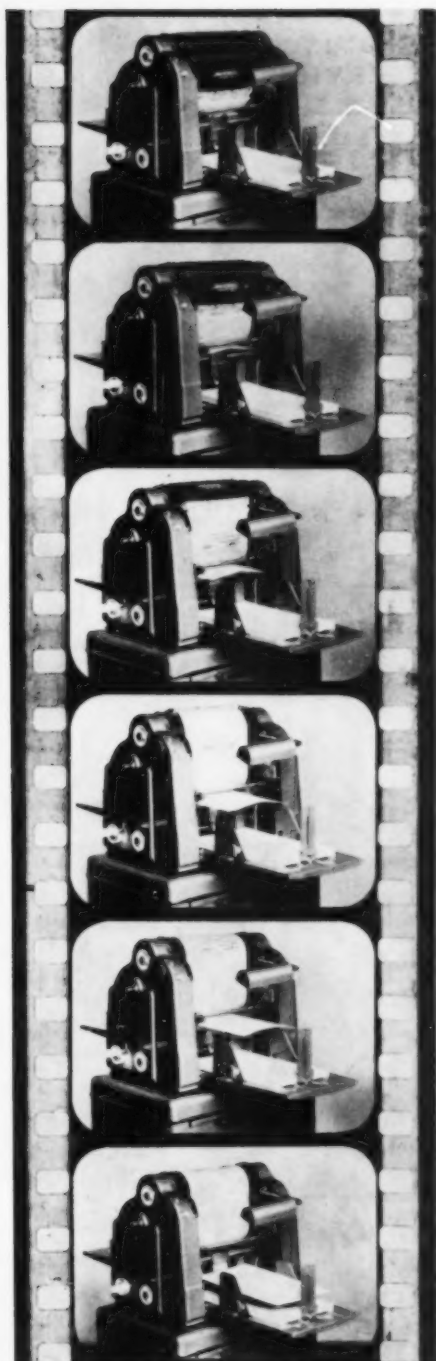
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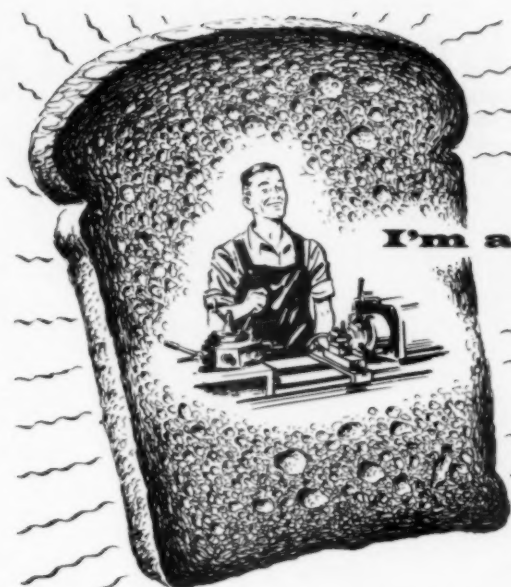


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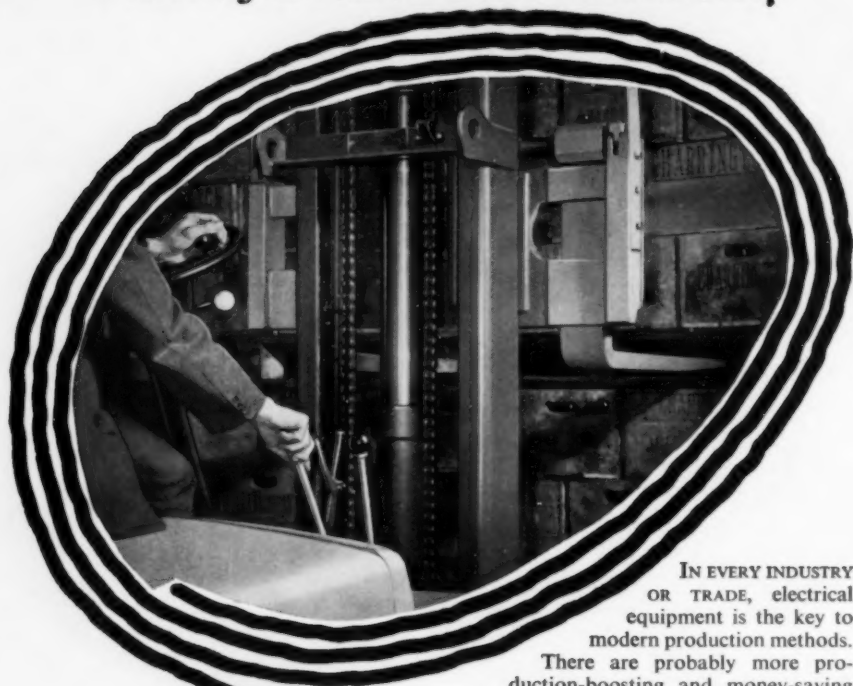
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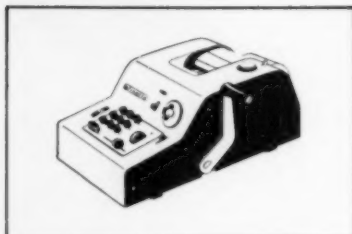
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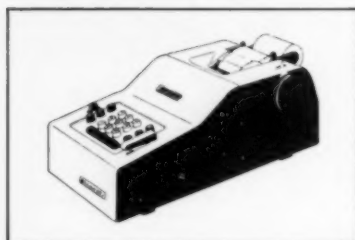
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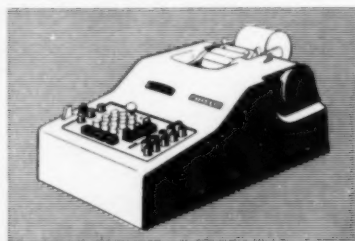
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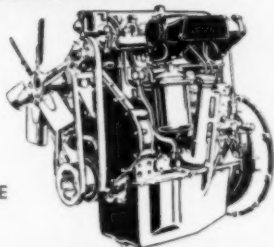
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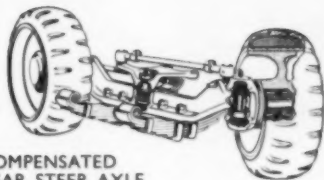
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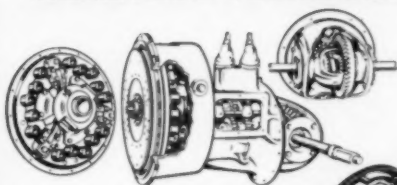
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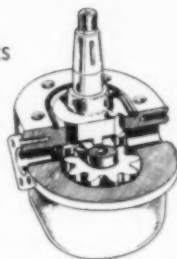


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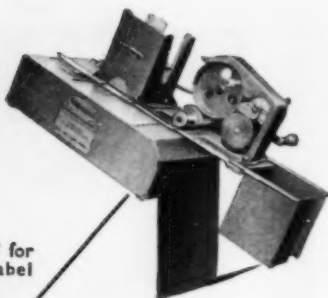
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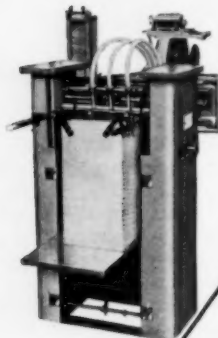


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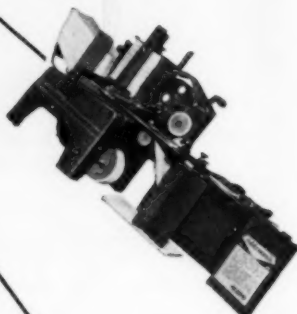


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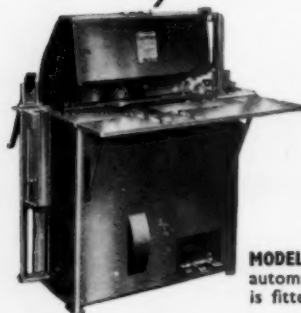
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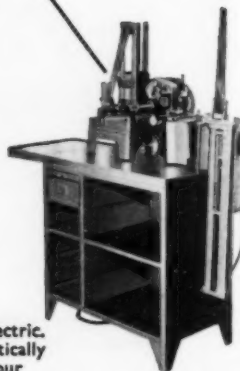
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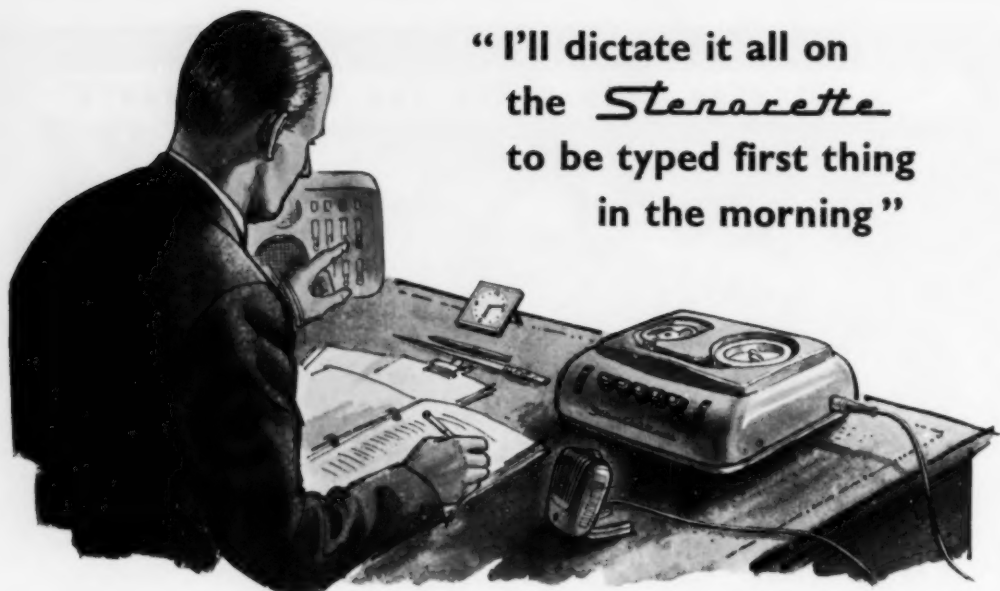
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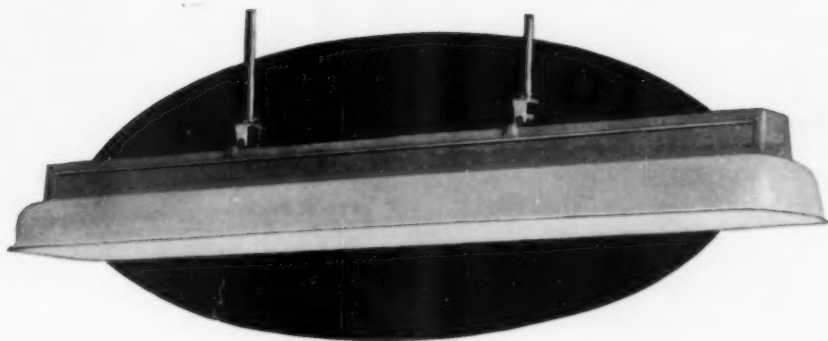
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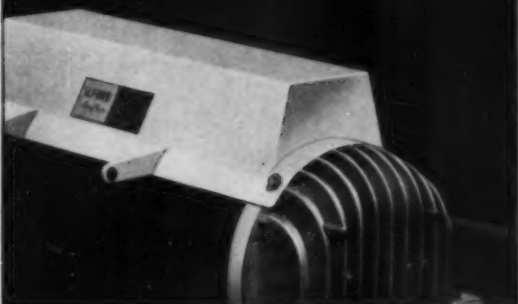
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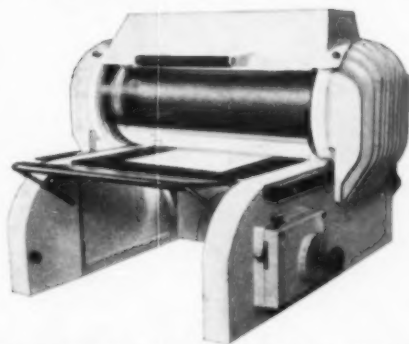
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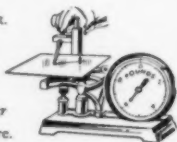
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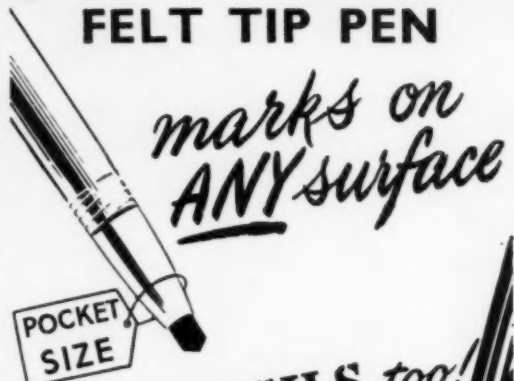
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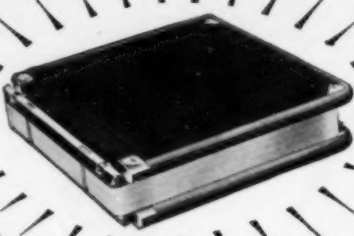
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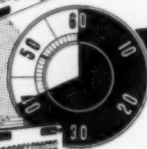
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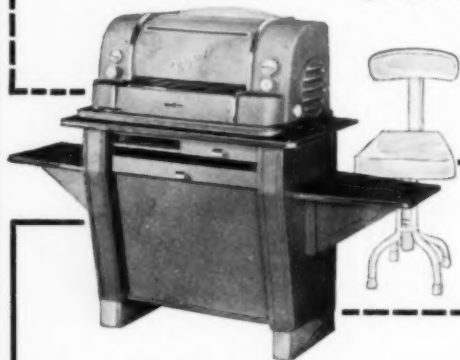
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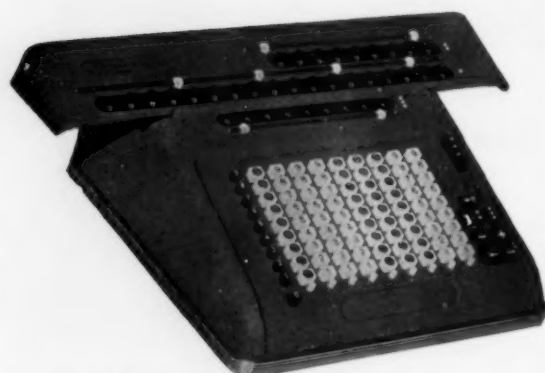
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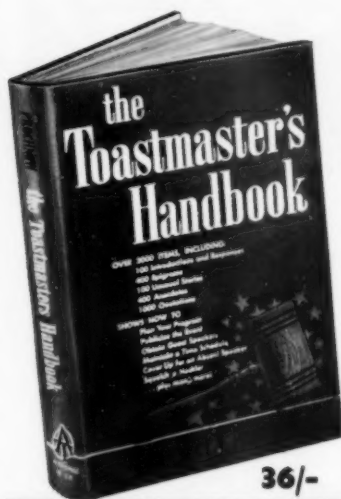
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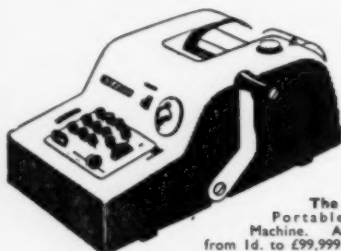
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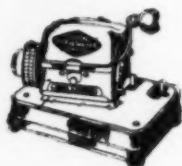


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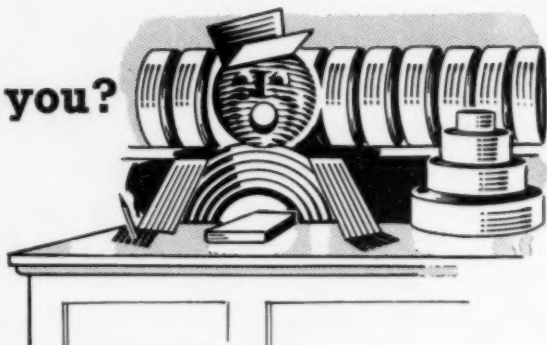
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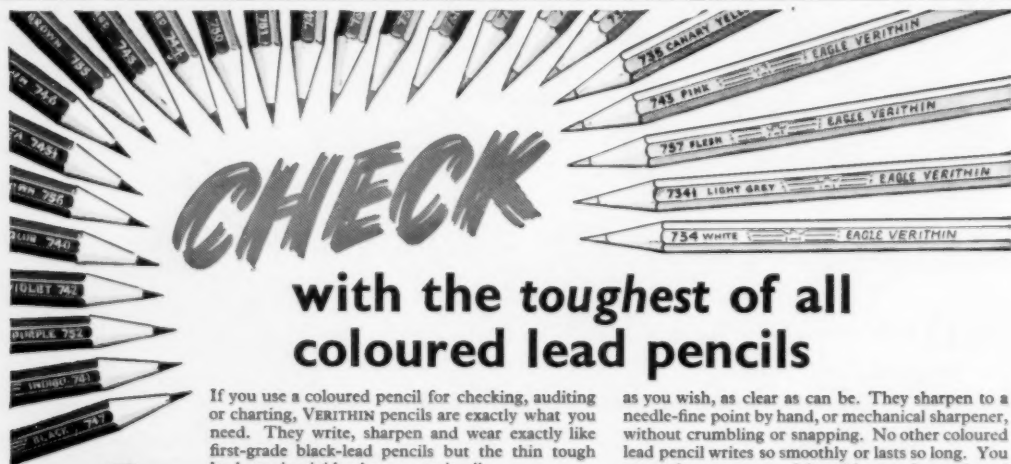
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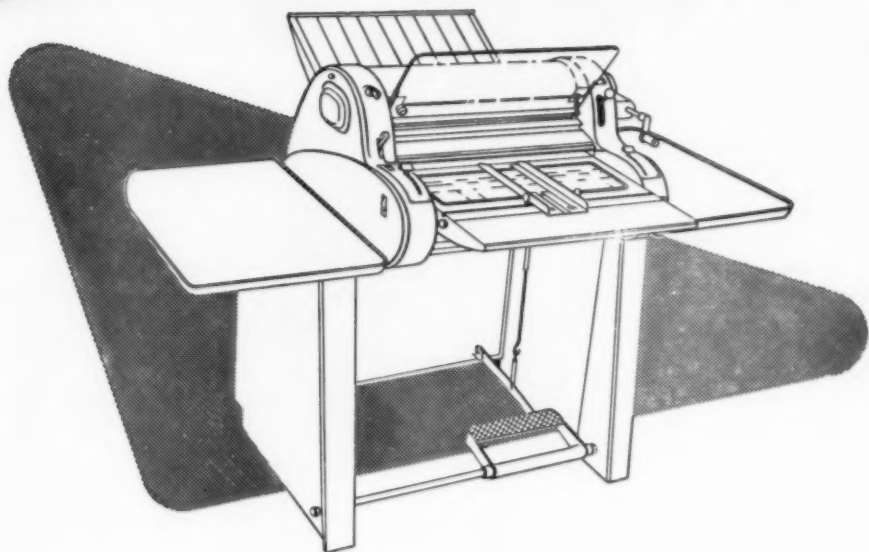
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PROSPECT

survey and forecast of business conditions

THE MONTH'S HIGHLIGHTS AND TRENDS

The Future of the Boom

London, September 21, 1954

● The remarkable achievement of British industry this year, with output running at an average of nearly 7 per cent above the level a year earlier, raises the question as to whether this rate of expansion can go on. An immediate answer can be given that the future of the boom is coming to depend less on the actions of Mr. Butler—and of Mr. Humphreys in the United States—and more on the astuteness of expansion-planning by individual business firms.

● To give the Chancellor of the Exchequer his due, both he and world trading conditions have helped the expansion of industry during the last 18 months. As to world trading conditions, exports have held up well and the terms of trade have moved slightly in our favour (during the last 18 months, only 2 per cent in our favour, but during the last 2½ years, 6 per cent). As to the Chancellor, he has played his hand carefully to obtain the benefits of favourable conditions. He has reduced the degree of monetary inflation, although cost inflation has never actually ceased, wages having risen 12½ per cent in the last 2½ years.

● However, it should be appreciated—and business men see this happening around them—that the rise in production during the last year has been very uneven. This is in fact quite the normal method by which industry expands. Certain industries which happen to be just ripe for a major expansion, leap ahead, while most of the others just plod along, and some may lose business even in the face of rising overall demand. (For example, beer output in the first eight months of this year was 15.8 million barrels, against 16.6 million in the same period last year.)

● To emphasise the extent to which the overall expansion of production has been dependent on spectacular progress in certain specific industries, it is proposed to compare here the latest output figure for a large sample of industries, with the corresponding figures for a year earlier. The "latest figure" is generally that for August or September (but in a few cases earlier, and also in a few cases quarterly figures have had to be used). As percentages, not absolute figures are given, the text has not been complicated by specifying which particular month's figure is referred to. In each case it is the latest given in the *Monthly Digest of Statistics* for September, and many of the figures are also given, with the month specified, on page 51 of this issue of BUSINESS.

● There has been a more than 40 per cent rise in the output of passenger cars, but this is not the greatest rate of expansion, although it has been the most publicised. The rise in output of clocks has been more than 47 per cent, and production of miscellaneous types of office equipment, excluding typewriters and accounting machines, has increased by 46 per cent.

● Perhaps first prize should really be given to the radio industry for an expansion of output of 75 per cent between mid-summer of last year and this. But in the same

continued on following page

THE MONTH'S HIGHLIGHTS AND TRENDS (continued)

period T.V. output fell 8 per cent, and it will be recalled that last year T.V. sales were greatly boosted by the Coronation, and radio sales were down, from which point they have achieved a remarkable recovery.

● Another output figure which has lately bettered that of passenger cars, is the one for wheeled tractors, which is up by more than 42 per cent. Amongst those which are under 40, but not very far under, are standard typewriters, with an output increase of over 35 per cent; domestic refrigerating machinery also up by 35 per cent, vacuum cleaners up 38 per cent, commercial vehicles 31 per cent, conveyers and elevators 33 per cent, linoleum 32 per cent and washing machines 26 per cent.

● In an intermediate category may be put portable typewriters, up 19 per cent; fork-lift trucks, up 16½ per cent; watches up 20 per cent; carpets and rugs up 12 per cent and commercial refrigerating equipment up 11 per cent. During the year the amount of electricity generated also rose by more than 12 per cent.

● Next we come to those industries which have barely kept pace with the average rate of expansion, or have fallen somewhat below it. Output of sulphuric acid shows an increase of over 8 per cent; steel ingots and castings have just kept level with the average, with a rise of 7 per cent; so has the output of china wares, with an average rise of 7 per cent. Below the average come stockings, with an increase of 5 per cent; the rate of building of permanent houses increased by just over 5 per cent; cotton yarn by just under 5 per cent; gas by 4 per cent; rayon yarn and staple fibre by 2½ per cent. Coal output has been relatively steady, and so has the output of worsted yarn, while footwear production fell by 4 per cent.

● These smaller figures do not, of course, mean very much, for output is fluctuating all the time and a later figure, if it were available, might show that a small *minus* has changed into a small *plus*. But there is a clear contrast between the industries which have made spectacular progress in the last 12 months, and those which have remained relatively steady.

● So much for a time of boom, but likewise in a time of recession it is the spectacular decreases which do so much to pull down the average level of production. Whether the present boom can go on depends largely on whether businessmen can avoid following the current trends too strongly, resulting in certain industries which show obvious prospects becoming over-expanded.

● The greater the current expenditure on market research and on development work in a wide variety of industries, the less the chance of the boom ending. What is wanted is a large number of new developments that open up market prospects in quite different fields.

● If, on the other hand, there is a too slavish following of the obvious trends, then no Chancellor can stop the boom being followed by a recession, unless he is prepared to bring about rapid inflation or take the powers of an economic dictator.

● During the last year, when the average rise in industrial production was nearly 7 per cent, employment in manufacturing industry rose by only 3 per cent, whereas employment in the distributive trades rose by over 5 per cent. These figures not only indicate a rise in productivity per head in manufacturing industry, but they also point to something which most customers are beginning to demand and enjoy again, as a peacetime "necessity"—better and slightly more lavish service at the retail end.

SALIENT FIGURES OF THE MONTH

Production index for July (8) was 116, or 10 points below June and 6 points above July last year. Provisional figure for August is 112-113, which also compares very favourably with 106 in August, 1953.

Value of exports (22) in September was £216.7 million, or £3.7 million above the August level, and £7 million above September, 1953. Imports in September (20) were valued at £285.8 million, or £19.1 million more than in August and £16.1 million more than in September, 1953. But the total was swollen by the import of aircraft from Canada, involving no payment.

Registered unemployed in September (7) fell by 4,000 to 236,000, and this is 56,000 less than in September last year. Total employment in manufacturing industry (3) rose by 64,000 in August to 9,092,000, or 269,000 more than a year earlier. The number of miners on the colliery books remained stationary at 706,000, or 6,000 less than a year earlier. The number employed in the distributive trades rose by 17,000 to 2,729,000, or 140,000 more than a year earlier.

Retail sales index in August (25) was 123, or 9 points less than in July, but 10 points above the level a year earlier.

Weekly wage index in August (31) was 143, or 1 point above the July level and 7 points above the level a year earlier. The retail price index fell 1 point in August to 144, which is 4 points above the level a year earlier.

'BUSINESS' INDICES

1. Production (12-month moving average) 1948=100
2. Purchasing Power ... (do.)

MANPOWER

3. Total manufacturing industries thousands
4. Textiles ... (do.)
5. Distributive trades ... (do.)
6. Coal (on colliery books) ... (do.)
7. Registered unemployed (G.B.) (do.)

PRODUCTION

8. Index of prodn.: total, all inds. 1948=100
9. Coal (average weekly output) (thousand tons)
10. Gas available at gasworks (average weekly output) ... (million therms)
11. Electricity generated ... (million kWh)
12. Steel ingots and castings (average weekly output) ... (thousand tons)
13. Cotton yarn ... (million lb.)
14. Rayon yarn and staple fibre ... (do.)
15. Worsted yarn ... (do.)
16. Sulphuric acid ... (thousand tons)
17. Passenger cars (average weekly, thousands)
18. Commercial vehicles ... (do.)
19. Permanent houses completed (thousands)

TRADE

20. Value of imports ... (£m)
21. Value of imports, Dollar Area ... (£m)
22. Value of exports ... (£m)
23. Value of exports, Dollar Area ... (£m)
24. Freight train traffic ... (thousand tons)
25. Retail sale index ... 1947=100

FINANCE

26. Currency in circulation ... (£m)
27. Deposits, London clearing banks ... (do.)
28. Provincial cheque clearings ... (£,000)
29. National savings, total outstanding ... (£m)
30. Gold and dollar reserves ... (do.)

WAGES AND PRICES

31. Weekly wage rates ... 1947=100
32. Retail prices ... (do.)
33. Price indices of materials used in:
 - Non-food mfg. industry 1949=100
 - Mechanical engineering (do.)
 - Electrical machinery (do.)
 - Building and civil engineering (do.)
34. Import prices ... 1952=100
35. Export prices ... (do.)

Latest Month	Increase (+) or Decrease (-) on a	Month Ago	Year Ago
* 125.2	+ 0.3	+ 8.6	
* 106.8	- 0.4	+ 2.7	

9,092	+ 64	+ 269
999	+ 4	+ 18
2,729	+ 17	+ 140
706	Same	- 6
† 236	- 4	- 56

* 116	- 10	+ 6
3,640	+ 115	+ 3
42.9	- 0.1	+ 1.8
5,028	+ 56	+ 637
† 372	+ 46	+ 26
13.84	- 0.84	+ 0.68
* 38.05	+ 0.67	+ 0.99
* 18.29	+ 0.21	- 0.03
* 161.3	- 4.2	+ 14.0
49.1	- 13.5	+ 20.0
16.7	- 3.0	+ 5.2
27.46	- 3.30	+ 1.46

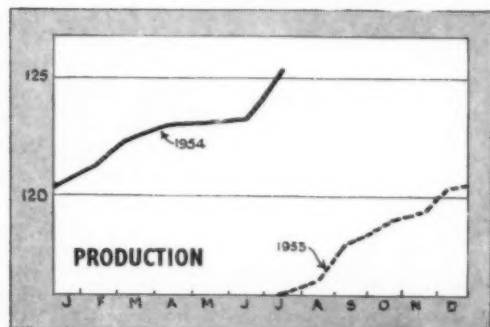
† 285.8	+ 19.1	+ 16.1
* 53.4	- 1.9	- 6.7
† 216.7	+ 3.7	+ 7.0
* 30.4	+ 1.0	- 5.0
† 4.09	- 1.28	- 0.21
123	- 9	+ 10

1,593	- 13	+ 96
6,519	+ 53	+ 279
700	- 73	+ 65
* 5,999	- 14	+ 27
† 1,037	- 5	+ 149

143	+ 1	+ 7
144	- 1	+ 4
143.1	- 0.6	+ 0.5
150.6	- 0.2	+ 7.4
159.4	- 0.4	+ 9.7
131.5	Same	+ 1.1
99	Same	Same
100	+ 2	Same

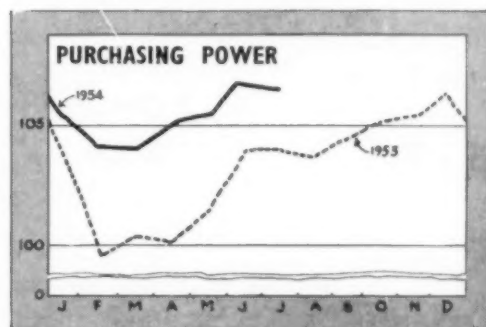
*July †September ‡Four weeks to August 15, 1954. All other figures refer to August.

'BUSINESS' INDICES (1948=100)



A twelve-month moving average of the Official Index of Industrial Production (Total: All Industries).

NOVEMBER, 1954



An unweighted index of currency in circulation with the public, total bank deposits, and total outstanding national savings.



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John is proud of his stamps. Each one is a lesson in the geography and history of our Commonwealth and Empire.

He is reminded that we in Britain share a heavy responsibility for the welfare and progress of almost 70,000,000 people living in Crown Colonies, Protectorates, Protected States or Trust Territories.

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How do we help — we in Industry?

We help by making things that they do not yet make for themselves. Dunlop helps also by large scale buying of raw materials, by developing rubber plantations — closely linked with advanced research — and opening up the country by the provision of tyres and wheels for all types of road and air transport. And finally as local industries develop and expand Dunlop is there to serve them.

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HOME MARKET

Regional Surveys

Midlands

NEVER before in peacetime has there been such a sustained period of industrial activity and mounting production. Trends are reflected in changes in the labour force of the main manufacturing industries. During June and July, while **engineering, vehicle and aircraft** production gained about 200 workers each, **textiles** lost nearly 1,150 and **clothing** 1,650. **Metal manufacture** had a gain of 150. In the eight weeks ended August 25, over 30,000 people were placed in employment in the region, and of this number more than one man out of every three went into **building and civil engineering** while engineering, vehicles and metal manufacture took the bulk of men placed in the production industries. Women went mostly into **textiles and clothing**.

Steelworks are maintaining a high rate of output and are fully committed to the end of the year for their full output of joists, sections and plates. **Structural engineers** are very busy and improved trade is being maintained among the re-rollers. Good outputs are being achieved by the engineering and speciality foundries. Demand for **tractors and other agricultural equipment** continues and manufacturers have well-filled order books: several producers are stepping up output. Only shadow on a bright industrial scene is **coal**. Though production has increased, consumption has outpaced it and stocks are lower than last year.

Since January of last year, **industrial development certificates** have been granted for 596 projects covering a total area of nearly 12 million sq. ft. Of these projects, 147 have been in the Birmingham area, 51 in Coventry and 29 in Wolverhampton. In addition, many extensions of less than 5,000 sq. ft. have been carried out and a number of Midland firms have built works extensions in South Wales. Most of the expansions of productive capacity are in the **vehicle industry** or in trades associated with it.

The British Motor Corporation's future plans embrace the expenditure of several million pounds including an extension to the press works of Fisher

and Ludlow in Birmingham. Applications have been granted for considerable extensions at Longbridge and expansion is also planned for the tractors and transmission branch in Birmingham. The Rover Co. are to spend £3 million on doubling production of Land Rovers and increasing car output by 50 per cent. A new 10,000 sq. ft. Rover factory is to be built at Solihull. Fresh expenditure of some £10 million is planned by the Rootes Group; the equipping of their new factory at Dunstable is practically complete.

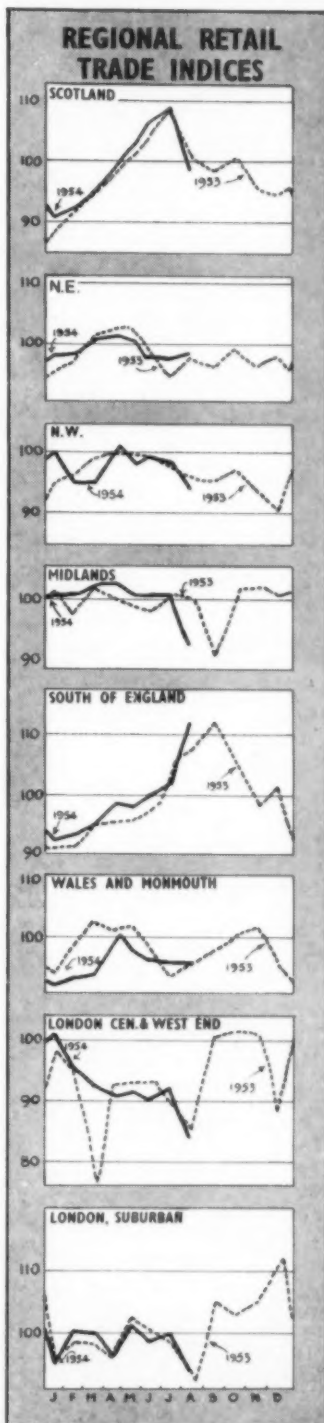
Manufacturers with experience of **multi-storey factories** are being invited to give the Midland Regional Board for Industry comparative maintenance, heating and other operational costs between single and multi-storey buildings. The inquiry is linked with Birmingham's need to expand upward rather than horizontally to save land. First building in the Midlands to be constructed on a new **plastics method** is a new workshop being built at the G.K.N. group research laboratory at Lanesfield, Wolverhampton. It enables the behaviour of the design under load to be accurately predicted, resulting in the saving of 30 per cent of the steelwork used in conventional designs. The laboratory, which will be finished by Christmas, is for pilot plant work using heavy equipment, enabling realistic experiments into production processes to be carried out. Hundreds of firms throughout the country are being invited by the British Road Federation to give details of their costs in moving goods between Birmingham and London on the present trunk roads. The intention is to show what savings could be achieved by constructing a new 90-mile motorway between the two centres.

A productivity conference, believed

Continued on page 57

What the Charts Show ➤

Indices in the charts show retail turnover in each region in non-food merchandise as a percentage of national average (=100) for the month. They are based on Board of Trade retail sales indices.

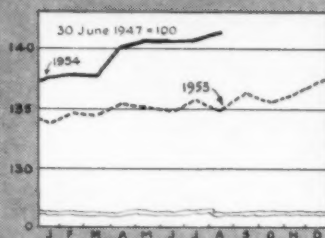


STATE OF THE NATION

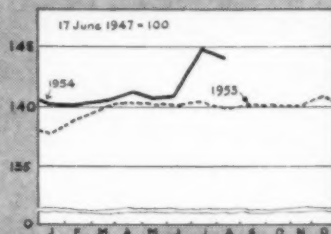
From this comprehensive series of charts, covering the main economic factors affecting the state of the nation, the businessman may gain a perspective of the situation governing his operations.

WAGES AND PRICES

WEEKLY WAGE RATES

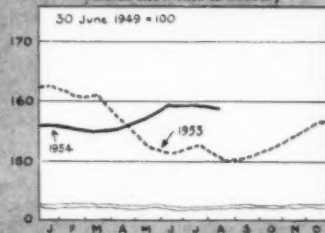


RETAIL PRICES



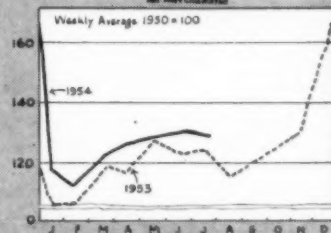
WHOLESALE PRICES

Materials used in electrical machinery



RETAIL TRADE

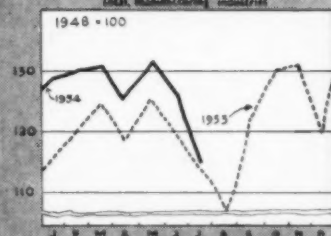
All merchandise



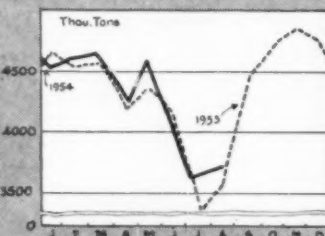
PRODUCTION

INDUSTRIAL PRODUCTION

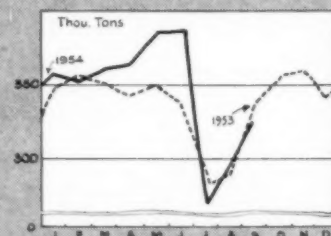
Total manufacturing industries



COAL

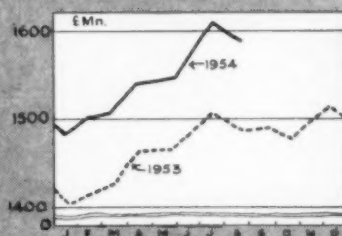


STEEL INGOTS & CASTINGS

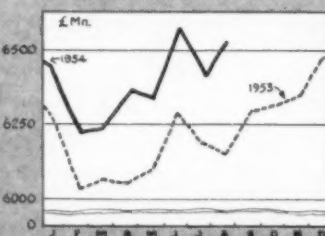


FINANCE

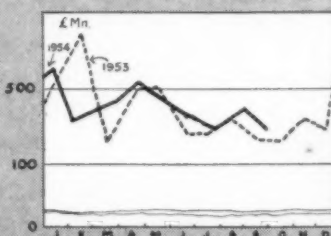
CURRENCY CIRCULATION



BANK DEPOSITS

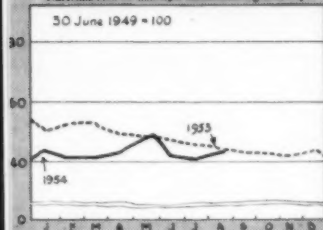


GOVERNMENT REVENUE



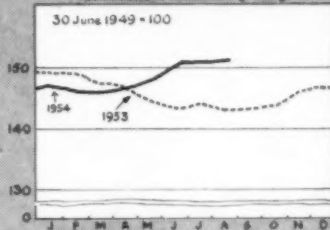
WHOLESALE PRICES

Materials used in non-ferrous manufacturing industry



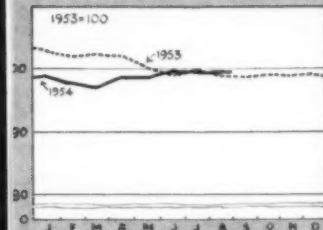
WHOLESALE PRICES

Materials used in mechanical engineering



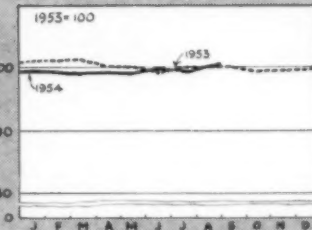
IMPORT PRICES

1953 = 100



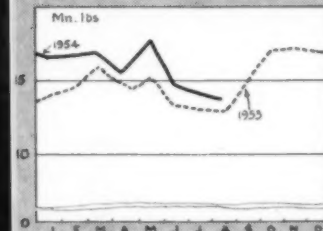
EXPORT PRICES

1953 = 100



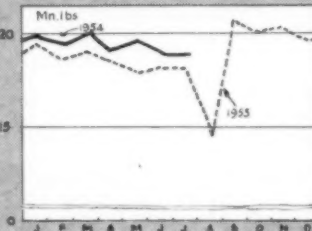
COTTON YARN

Mn. lbs



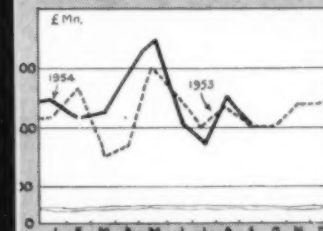
WORSTED YARN

Mn. lbs



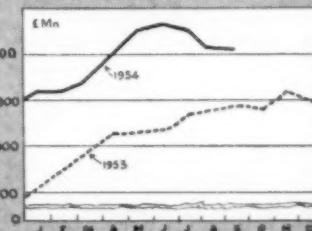
GOVERNMENT EXPENDITURE

£ Mn.



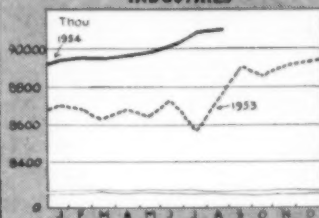
GOLD & DOLLAR RESERVES

£ Mn.



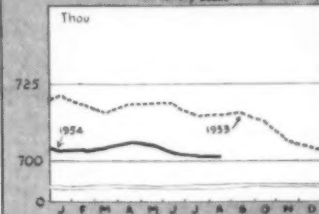
LABOUR

TOTAL MANUFACTURING INDUSTRIES

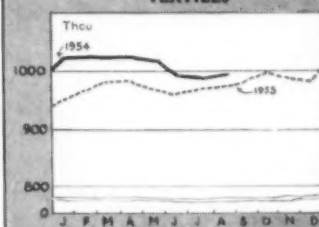


COAL

64 colliery books

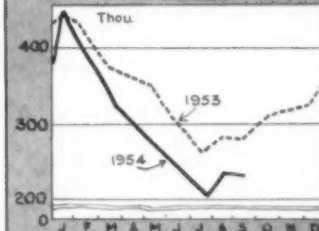


TEXTILES

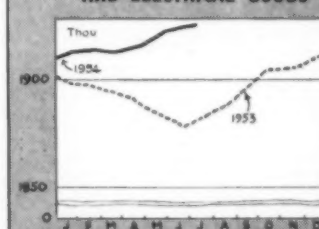


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Great Britain



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HOME MARKET REGIONAL SURVEYS (cont. from page 53)

to be the first in which a high proportion of both office and works employees have taken an active part, has been staged jointly by two Midlands firms—Boxfoldia Ltd of Bournbrook, and Hymatic Engineering Ltd. of Redditch. Each firm invited 60 representatives from all departments, and in addition 30-40 representatives attended from seven other companies who are members of the Management Research Group in the Midlands.

Mr. A. B. Waring, managing director of Joseph Lucas Ltd., has told a meeting of the Institution of Production Engineers and the Birmingham Productivity Association that engineering works can reduce normal hours of work from 44 to 37½ and save 6 per cent in the cost of an article by introducing two **day shifts**—between 6 a.m. and 10 p.m. (Types of shift work are discussed on page 82).

On a visit to Stoke-on-Trent last month Mr. E. M. Gunderson, leader of the special British Columbian trade mission, invited the British Pottery Manufacturers' Federation to establish **group showrooms**, sales organizations and warehouses for the quick replacement of stock in Vancouver. The Federation have reacted positively to the proposal.

One of the first "**dry rooms**" in Britain to conform to new regulations governing the pre-packaging of radar and electronic equipment for the Services has been built by Geo. Salter and Co., the West Bromwich spring manufacturers, at their Smethwick factory. Electronic equipment is used to keep humidity at a fixed low level and to control temperature. The firm's Salterpak Division, which started as a small section devoted to pre-packaging products to Ministry of Supply standards giving protection against tropical heat, insects, etc., has now grown to employ nearly 100 men and women. Work is undertaken for other Midlands companies.

In W. and T. Avery's new £1.2 million **iron foundry** at Tame Bridge, current output is about 100 tons a week. It is designed to replace the firm's foundry at Soho Works, Smethwick, and when it takes over completely should be capable of turning out 500 tons a week of castings ranging from a few pounds to 10 tons, and also special alloy castings. About 250 men will be involved in the transfer.

As a result of substantial increases in sales, the West Midlands Gas Board have decided to hold prices at present

levels until at least April next year. The East Midlands Gas Board are to revise their gas tariff from November 8 to raise an additional £500,000 in annual income. Since last December, when the Board reduced prices, they have faced additional expenditure of approximately £1 million a year.

A major financial interest in Goodwin-Barsby and Co., Leicester, one of the pioneer makers of crushers and other equipment for stone quarries and gravel pits, has been acquired by Aveling-Barford Ltd., of Grantham.

London and S. E. England

A HIGH level of employment is being maintained by manufacturing industries and there are signs of further expansion. Trades that are taking on more workpeople include **glass, chemicals, aircraft, tools, plastics, electrical machinery, watches, radio and T.V. apparatus**. There have been some decreases in employment in **scientific, surgical and musical instrument** manufacture, with **clothing and furniture** showing a seasonal drop. Demand for **domestic appliances**, which was stimulated by the removal of hire purchase restrictions, still continues.

Short-time working in the women's section of the **clothing** industry has been less pronounced, and the majority of firms in North and East London are now working full time. The number of people employed is just over four million; unemployment for the whole region is 0.7 per cent, a decrease of 12,740 during the third quarter. Outstanding in **export business** has been the order for 37 *Viscounts* placed by Capital Airlines. Taylor Woodrow, of London, have secured a £2.5 million contract to build a university and school buildings in Rangoon.

About £23 million of **rebuilding** is now in progress in London, providing when completed some 3 million sq. ft. of office space. A further £13 million of work has been licensed or approved, and the programme aims at a target of about £1 million of building a month. All industrial undertakings equipped with private generating plant have been urged to make maximum use of it as a means of reducing the **electricity load** during peak hours this winter. The new B.E.A. £18 million **power station** at Brunswick Wharf has recently been opened. It will ultimately be capable of generating 330,000 kW.

First regular **helicopter freight service** between London Airport and Gat-

wick has been inaugurated by a Bristol 171 helicopter of British European Airways, which recently made the journey in about 15 minutes carrying a 700lb. load. Silver City Airways, who operate the cross-channel vehicle ferry service, have now consolidated their Le Touquet, Calais and Ostend car and cycle ferries at Ferryfield, their new £300,000 **airport** at Lydd. Opened in July, Ferryfield is already carrying more freight than any other airport in the country.

Silver City are to operate Britain's first regular international helicopter services. Next year they will start flying freight, but passenger services are not expected to start until larger aircraft are available. International Aeradio Ltd., of London, have entered into an agreement with Adalia Ltd., of Montreal, whereby both companies will offer **consultancy services** as a consortium to governments and industry on a world-wide basis, pooling specialist knowledge, experience and personnel on specific projects. First contract has been secured with the Creole Petroleum Co. of Venezuela.

Cost of **decentralizing industry** from the county of London is between £50 and £70 million, according to the vice-chairman of the L.C.C. housing committee. There are now about 500-700 acres of "non-conforming" industry in London and it is estimated that the cost of removing this is about £100,000 an acre. The movement outwards is at present being held up by Government delay in announcing decisions about grants for the expansion of Ashford, Kent, a test case. The decentralization is due to be completed within 20 years. The Council of Industrial Design are working out details of a permanent exhibition of the best in **British industrial design** which is to be set up in London at a cost of £50,000.

New **research** and development headquarters are being constructed by John Laing and Son at Elstree, and departmental staffs strengthened. Emphasis in future work will be on evolving ways of cutting prices. Believed to be the world's first private enterprise research station built to study the scientific packing of such items as aero engines and electrical instruments, the £100,000 **laboratory** of Export Packing Services Ltd. was opened on October 14, at Sittingbourne, Kent.

Mr. Wallace V. Smedley, chairman of the National Canning group of companies, is offering £100 in **prizes** for the

best suggestions made by students working at Smedley factories to improve production techniques or increase output. The Faversham, Kent, premises of British Fruit, one of nine works owned by National Canning have been extended by 50 per cent at a cost of £200,000. Production of tinned and frozen fruit and vegetables there is to be increased.

Tiltman Langley Laboratories Ltd., the research and development engineers of Redhill, Surrey, have acquired control of Mid-Century Engineering Ltd., Cranleigh. This will enable them to increase production potential. A new factory is planned during the next few months nearer the parent company at Redhill.

A London syndicate, Richborough Estates Ltd., have begun to develop Richborough as a port and an industrial area. They control more than 600 acres of the port area and plan to build factories there and to erect a power station by 1960.

North-Western

THE Industrial Disputes Tribunal award of a wage increase of 6 per cent on current earnings to the 290,000 workers in the cotton spinning and weaving industry will add about £5.5 million a year to the industry's wage bill. Concern has been expressed on the employers' side, and largely as a result of the award the Granville Mill Co. of Oldham decided to discontinue spinning. The wage increase will be a severe blow to the industry as a whole, which is suffering from shortage of orders and facing increased foreign competition, and there may be some weeding-out of the least efficient producers. Poor trade has recently been experienced in East Lancashire weaving towns where there has been some concern at the increase in imports of textiles not for re-export. Imports of grey cloth for the first eight months of the year were 2.5 times as great as for the corresponding period in 1953.

The British cotton industry and 38 leading Australian retail stores have been combining to hold "British Cottons" weeks in Perth, Sydney, Brisbane, Adelaide and Melbourne—the five state capitals. Over 140 cotton goods firms exporting to Australia and their agents collaborated in various ways in a major sales promotion campaign with the general theme "Always buy British cottons." Top-level executives have been visiting the market,

which is perhaps the best long-term prospect for the industry. The campaign has aimed to meet continental and Japanese competition and to stimulate orders for British goods in 1955-56. In Manchester, at the Colour, Design and Style Centre, has been running the first exhibition ever of British cotton for men. The men's wear trade absorbs some 16 per cent of the cloth output for the home market, equivalent to over 200 million yards a year.

International Cotton Federation returns reveal that the quantity of machinery in place in the U.K. last year declined from 27.25 million to 26.45 million spindles, a drop mostly accounted for by a decline in the number of mule spindles. There was also a considerable fall in the amount of cotton spinning plant in Britain using Egyptian-type cottons. Spindleage so engaged went down by over 3 million. In the same period the number of spindles spinning rayon staple fibre rose from 2.5 million to 3.8 million. On average, British machines worked shorter hours than the industries of other countries. Spindle hours for the six months ended January 1954 were 974: highest total was 4,203 spindle hours worked by machines in Hong-kong.

Platt Bros. and Co. are to build a new modern iron foundry at their Trafford Park works, which will make it self-supporting for castings. This will be the sixth mechanized foundry plant installed in the group since the war. During the past five years, approximately £1 million has been spent by Platt's research organization and an even larger sum has been expended on development work in the group's manufacturing companies.

Now under construction at Stanlow oil refinery, Cheshire, is the first plant to be built in the U.K. for the production of "iso-pentane," an important constituent of aviation gasoline. The main contractor carrying out the work for Shell is Head Wrightson, and the unit is scheduled for completion early in 1955. It will cost nearly £500,000. Stanlow, with an annual output of nearly 5 million tons of various oil products, is the largest of the four Shell refineries in this country.

Manufacturers of well-known brands of housewares, Platers and Stammers Ltd. are building an extension to their main Burnley factory, which will add approximately 111,000 sq. ft. to the floor space. The addition will be so

built that two further floors can be added if required. The company, who have other factories in full production at Blackburn, Derby and Mexborough, plan to introduce new lines at Burnley and to step up production of existing products to support their sales drive in home and export markets.

A major tooling-up programme has been undertaken by the Hawker Aircraft Co. at their Blackpool factory to build the *Hunter*. A new 2,000-yd. runway has been constructed and eventually a labour force of over 5,000 will be required. Primary fatty alcohols which, with their derivatives, are used in the textile, leather, plastics, synthetic rubber and other industries, are now being produced from a new £500,000 plant at Whitehaven, Cumberland. The plant has been designed by the manufacturers, Marchon Products Ltd., to produce in addition chemicals from other raw materials. Largest machine of its kind outside the U.S., the *synchro-cyclotron* at Liverpool University, is now in operation. Built by Metropolitan-Vickers Electrical Co. with D.S.I.R. funds, it produces a beam of protons of about 400 mv. energy, and is to be used as a research tool in nuclear physics.

Manufacture of gas and coke by the revolutionary new "Rochdale" process, which doubles the productivity of vertical retort gas-making plant, is now for the first time in full commercial production at the Partington works of the North Western Gas Board. Plant which was built to produce 2 million cu. ft. of gas a day is now turning out double that quantity. Design, manufacture and installation of the conversion equipment have been completed in six months. An important part of the new process is that it enables coals normally considered unsuitable for gas-making to be carbonized as successfully as the highest grade coals.

Urging that immediate reconsideration be given to the problems of road and bridge construction within the Lancashire County area, the Lancashire Chambers of Commerce have made representations to the Minister of Transport. The three most pressing schemes on which the Committee urge the Minister to authorize commencement of work are the North-South Motorway, Barton Bridge and the Cheadle By-pass. Approval is being sought from the Ministry for an arch bridge spanning the Mersey between Runcorn and Widnes. Cost is estimated at £1.7 million.

EXPORT MARKET SURVEY—S. Africa

ANY country that is progressively pulling down its trade barriers repays the closest study, and South Africa is a current case in point. In the words of Mr. E. H. Louw, Minister for Economic Affairs, the Government is now "busily abolishing" import controls, and the expectation is that within two years such measures will be a thing of the past. Among relaxations announced for 1955 are important concessions on the importation of industrial machinery.

This positive course of action reflects the present sound state of the Union and the optimism with which its leaders look ahead. The general business barometer is set fair; production in the great basic and in the secondary industries continues to be well maintained; and, as a result of two good agricultural seasons, business with country traders has improved. As new developments and enterprises reach the stage of full production, the industrial tempo will quicken still further, giving rise to increased capital and consumer demand.

Already, out of every £15 worth of goods exported from the United Kingdom, approximately £1 worth goes to the Union. For the first six months of this year, South African imports, at £226 million, were £15 million higher than in 1953 while exports were £20 million up. Among import groups that have risen this year are: textiles, apparel, fibres, yarns, up by £5.8 million; drugs, chemicals, fertilizers, £1.8 million; crude oil, waxes, resins, £1.3 million; wrapping papers, books, £1.2 million.

Due to the high rate of capital influx and to larger receipts for exports of gold, uranium, maize, sugar and other products, it is possible that the year will show a net surplus in the Union's balance of payments for the first time since 1950. It seems likely that in the near future the greater portion of South Africa's foreign income will again be derived from the sale of minerals abroad; income from that source may, indeed, multiply two or three times during the next few years.

Since the war, the Union has made spectacular industrial strides, with a speed of advance in the setting-up of secondary industries that has in some cases outstripped available power and labour supplies. But difficulties are being overcome and foreign investment has been a source of strength. In the

last eight years, Britain has invested between £400-500 million in various enterprises, among them new factories for the manufacture of such products as sheet glass, electrical cables, pianos, waxed wrappings, soap, steam boilers, batteries, vehicles and cycles. The British Government has a major stake in the uranium industry, the Union's newest and most important development. South Africa has possibly the largest deposits of uranium in the world and the product may well increase the gold mining industry's earnings by £30 million a year. To date, 23 gold mines have been scheduled as uranium producers and the estimated profit for the first half of this year was £3.3 million.

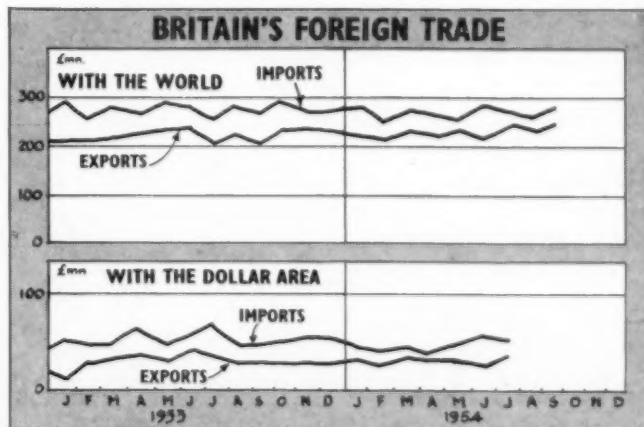
Already there is talk of utilizing uranium to produce electric power. During the past five years, the Electricity Supply Commission has increased generating capacity by 45 per cent at a cost of £70 million. The Union's proved coal reserves are conservatively estimated at 75,000 million tons, and last year's production was a record with a sales output of 30.6 million tons—an increase of 150 per cent in 30 years. In the Orange Free State, with its 2,000 million tons of untapped coal, the world's largest plant for the synthesis of oil from bituminous coal is being established—a logical step in a country that has no known petroleum reserves. By-products alone will provide the foundation for a large chemical industry besides making available raw materials for many new undertakings.

More than £100 million has been

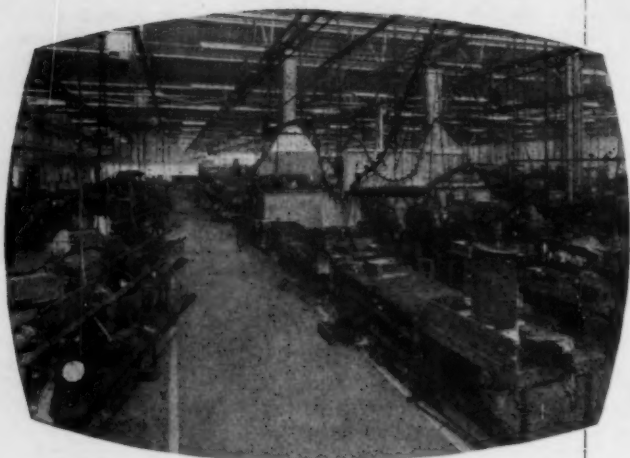
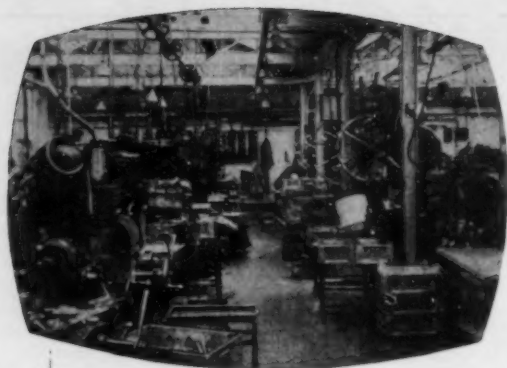
invested by the Railways and Harbour Administration and now 36 per cent more revenue-earning traffic in terms of ton-miles can be handled. Future railway development plans include the provision, at a cost of £13 million, of services to the new urban non-European townships which are to be established, and the doubling of the Rand-Durban line, which is now the Union's busiest. Roads, too, are being rapidly developed, and with traffic restrictions easing there is an increasing demand for motor transport and for larger-capacity vehicles.

Building plans representing £36 million worth of construction were passed in the nine principal areas of the Union during the first six months of this year, compared with £29 million worth for the corresponding period in 1953. Of the 1954 figure, well over half was for private dwellings and flats. Factory plans totalled £3.6 million, plans for private non-residential buildings £6 million and for public buildings £1.8 million. Municipalities have spent large sums on essential services.

The belief is growing that the industrial expansion of South Africa will eventually centre on Natal because of its rich water resources: it has eight big rivers. The growth of European population and industry between 1946 and 1951 was greater in Natal than in any other province. Natal's rayon pulp factory, which will eventually be one of the biggest of its kind in the world, goes into production next year. Half of its 40,000-ton annual output will be sold to the United Kingdom.



Wise finance changes the picture



ICFC capital made possible the complete rebuilding of the premises of this foundry and engineering business. The old machine shop (top) contrasted with the assembly line and part of the machine shop in the new works.

ICFC capital has changed the picture for many industrial organisations by financing new buildings, new plant and schemes of general expansion. The Corporation provides finance in the form of long-term loans on fixed terms, or share capital, to industrial and commercial enterprises in Great Britain. Amounts range normally between £5,000 and £200,000.

Formed in 1945 by the English and Scottish banks, ICFC has already aided the expansion of British industry by loans totalling over £40,000,000.

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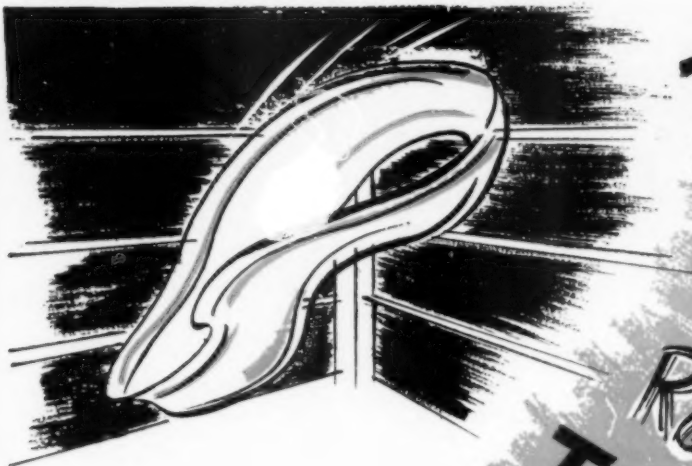
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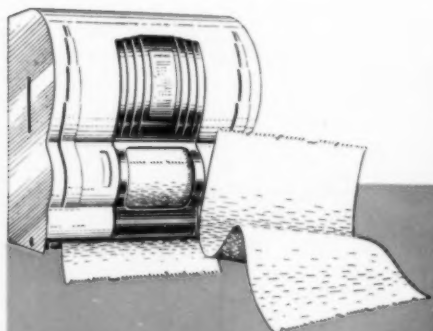
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In many of these cases there was a watchman on duty when the fire started or the premises were broken into.

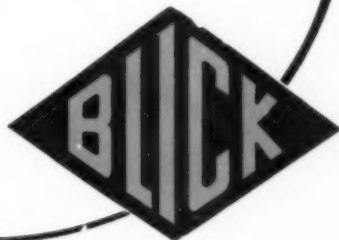
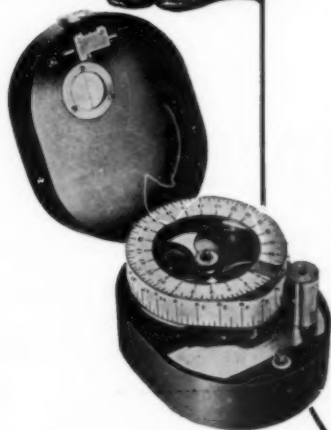
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The March of Business

PRINCIPLES OR PRACTICE?

FORTHRIGHT criticism of management training was contained in a recent speech to the Southport conference of the Young Newspapermen's Association. Colin A. Cooke, senior bursar of Magdalen College, Oxford, said: "The whole of the present-day urge to study and improve management by research on how to manage is a huge mistake . . . because we are trying to apply a technique to a field in which it not only has not, but never can have, any application." He recalled that the Government had "subsidised the fuss about management. The British Institute of Management came into being with immense pomp and ceremony, and the air was filled with the thunder of hooves as 'management experts' and those bold buccaneers who practice as consultants, charged into the new edifice to take possession. . . . With this immense wealth of experience, talent and—yes—genius in management behind them we could reasonably have expected a lead on what management is, and, if it is teachable, how to teach it. But not a word. Vast masses of printed paper pour out upon us: papers are read on the oddest subjects; conferences are called here and there about the country; much discussing, much travelling . . . and yet I don't believe that anyone has really learned anything from all this about management."

Mr. Cooke went on to assert that there is "no such science as the science of management," no body of principles that can be taught. He suggested that "any school or institution teaching management is, in fact, only teaching stuff that has an indirect bearing on management," such as methods of organising an office or planning production.

Mr. Cooke apparently understands the editorial policy of *BUSINESS*. Our attitude towards "teaching management" is the very practical one of publishing case studies, showing exactly how a firm is using a particular technique to increase their efficiency, in factory or office. Mr. Cooke is exaggerating when he says there are no principles of management. For example, one principle is that a responsible executive should not have more than say six subordinate executives reporting directly to him. But such principles are so obvious and so elastic in practice, that they require little teaching, and hardly make up a complete body of learning.

Only harm can result from endeavouring to raise the "professional"

status of so little so high. In training future managers, the few principles that can be taught need to be filled out with ample practical experience, which in turn can be enlarged upon by a study of case histories. Also, meeting other managers in conference makes possible a useful exchange of ideas.

In the past, businessmen have been content to regard themselves as a group distinct from the learned professions. Today in many firms much of the work of the businessman is delegated to managers. They are a very important group in their own right, and have nothing to gain from pretending to be one of the learned professions, although many managers, individually, may be professionally qualified.

★ ★ ★

AT the recent Incorporated Sales Managers' Association conference in London, a useful transatlantic exchange of sales methods took place. In the morning, British techniques were demonstrated; then in the afternoon members

of New York's National Sales Executives Incorporated demonstrated American methods. Among those chosen to show what British salesmen can do was W. E. Wood, Assistant Sales Manager of the Lamson Paragon Supply Co. Ltd. Readers may recall that Mr. Wood contributed an article to the January, 1953 issue of *BUSINESS* on "How We Organised for Hard Selling." In this he described in detail how his company had overhauled and improved their sales organisation and methods.

★ ★ ★

YOUR FACTORY, SIR!

ALTHOUGH the Board of Trade has done very valuable work in establishing trading estates in the development areas, and attracting a variety of industry, there is another side to this medal. Most businessmen do not want to be told where to build their factories.

Nevertheless, for the industrialist who does not want to be bothered with all the intricacies of factory building, and has insufficient capital to buy a building, the Board of Trade has provided a useful service. Now, however, they have met an enterprising competitor in Colin A. Samuels, chairman of a relatively new building group. Like the Board of Trade, he

NEXT MONTH

Employee Shareholding Schemes

The December issue of *BUSINESS* will present a number of case histories of some of the most successful schemes launched on both sides of the Atlantic for helping employees to become shareholders. These studies will be followed by a summary of business experience to date, pointing to the snags and the advantages, and suggesting some features of the ideal employee shareholding scheme.

Point-of-Sale Advertising

There will also be an article in the December issue describing some of the techniques now being used in point-of-sale advertising, the trends in this developing field, and the economics of spending money on point-of-sale material.

THIS MONTH'S COVER PICTURE

Research into ways of improving the versatility of electronic computers is carried out in the Control Mechanisms and Electronics Division of the National Physical Laboratory, Teddington. Picture shows the small Paris computer—a mock-up used in such work as the development of larger magnetic stores. On page 73 of this issue there is a special survey of the types of electronic equipment already available, and those which will be available in the near future, for speeding-up business calculations and procedures.

THE EMIDICTA EQUATION...

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If a secretary sits by your desk just waiting . . .

if you wait for her to finish typing . . .

then sheer habit has made you accept unwieldy methods.

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the Emidicta system separates the functions for you . . .

You dictate in your own time . . .

while she types the previous recording . . .

achieving a smooth increase in the number of completed letters,

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takes the complete building burden off the industrialist's shoulders, but with a difference. He will build a factory anywhere in the country to suit the industrialist, provided of course local authority permission can be obtained.

Mr. Samuels is already producing more than £1 million of factory buildings a year, and he has built up a team of professional firms—real estate consultants, architects, quantity surveyors, consulting engineers and solicitors, who work together to handle every aspect of design and preparation for a client's building. The architect is not the top man, but a member of the team.

By planning the building in detail, in advance, and giving joint consideration to all the industrialist's needs, the team claim to be able to cut building time by more than one-third, and give final, not provisional estimates of cost. The group also have arrangements with insurance companies for financing their factories, which are let to manufacturers, generally on a 60-year lease. And the buildings are designed with a "high convertibility factor," so that they will be easy to sub-let, should an industrialist wish to move.

★ ★ ★

A RECENT survey of State College graduates in the United States, confined to those who had been graduated 16 years and were therefore well established in business or the professions, showed that 82 per cent. of them had some kind of workshop at home, and 37 per cent had equipped it with power tools. When the brain-worker finds relaxation in his workshop, scope is at the same time given to invention.

★ ★ ★

RÔLE OF EXHIBITIONS

THE recent Business Efficiency Exhibition at Manchester was very successful. Attendance was more than 50 per cent above the level four years ago, when the exhibition was last held at Manchester. That the annual B.E.E. is a great aid to sales of equipment is undisputed, but it also serves other valuable purposes. First, it provides an opportunity for those who use the equipment, as well as those who buy it, to see how it works. A demonstration to a head clerk or a secretary may in the long run be nearly as valuable as a demonstration to a managing director. And second, the exhibition provides a means of comparing the various types of equipment available, so that the customer may readily choose that which is most suitable for his own purpose.

Every manufacturer of office equipment is in the nature of a business efficiency expert. If he had had no

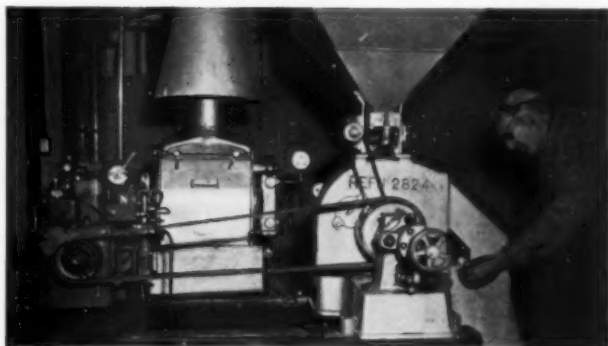
People Products Places-I

NEW B.O.A.C. EXCHANGE

—Operators at work in the new B.O.A.C. private branch exchange at London Airport, which was manufactured and installed by the Automatic Telephone & Electric Co. Ltd. One of the new features is a "hold for enquiry" system which enables users to hold an incoming exchange call and to make, at the same time on the same telephone, a further call to an external or internal line.



40,000 MILES BY AIR—Former test pilot J. R. S. Halford has recently been appointed export sales manager of I.T.D. Ltd. During the past twelve months, Mr. Halford has covered more than 40,000 miles by air on a tour of his firm's overseas distributors, and his most important task now will be to develop exports of industrial trucks for mechanical handling purposes.



THE NEW STEAM ERA—Developed jointly by Ricardo & Co. Ltd. and the National Research Development Corporation, this new corn-grinding mill is powered by a steam engine—one of several small-type models planned to bring a form of mechanization, using indigenous fuel, to backward areas of India and other Asian countries.

P.P.P. Continued ►



drat that clatter!

A properly typed letter should take minutes, not half-an-hour. But in a noisy room who can be expected even to *think* properly? Lots of little sounds become big noises—to someone else. You can't prevent other people's noise battering into your thoughts, ruining your work, jangling your nerves . . . unless, of course, you consult Cullum. Cullum know how to sponge up sounds before they can cause harm. You *must* have heard of Cullum.

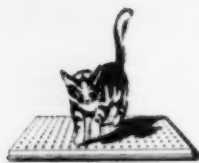
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PROGRESS WITH QUIETNESS

68

BUSINESS

original ideas about increasing efficiency, he would not have started manufacturing equipment. The annual exhibition and the provincial exhibitions are great cross-fertilisers, helping to put the right equipment to the right use in the right place.

★ ★ ★

THE 1955 National Factory Equipment Exhibition, to be held at Earls Court from March 28 to April 2, will be nearly seven times the size of the first exhibition held in 1953. The Institution of Works Managers and the National Industrial Fuel Efficiency Service are holding conferences at Earls Court in connection with the exhibition.

★ ★ ★

TRENDS IN COMPETITION

An important contribution to the history of British and Dutch enterprise has been made with the publication of a two-volume *History of Unilever*,* written by a Cambridge historian, Charles Wilson. It describes passionately both the strong and the weak points of William Lever, Anton Jurgens and other early leaders of the group, and it traces the effects—good and bad—of the series of amalgamations which resulted in the building-up of so vast a soap and margarine empire.

After two volumes of detailed description, Mr. Wilson is able to point out an interesting trend in the development of large-scale enterprise. He says: "Inevitably the process of concentration has been accompanied by a search for insurance against the extremities of risk. There have been times when it appeared that this reasonable object might well turn into an attempt at monopoly. Certainly those upon whom the leadership of the industry had devolved in the second and third decades of the century missed no opportunity of extending their share of the market. But if monopoly was the object it evaded its pursuers, and from about the twenties different ideas began to animate those who were taking over responsibility for management . . . they saw the threat of monopoly to business efficiency. Yet it remained true that a growing business was a healthy business."

"But from about this time a new conception of growth began to make its appearance. Instead of the struggle for an ever-larger share of existing markets, there came into being a series of campaigns to launch new commodities and to open up new markets. Now, in this particular context, it really represented nothing more complicated than the common-sense policy, old as business itself, of spreading risks, geographically and commercially."

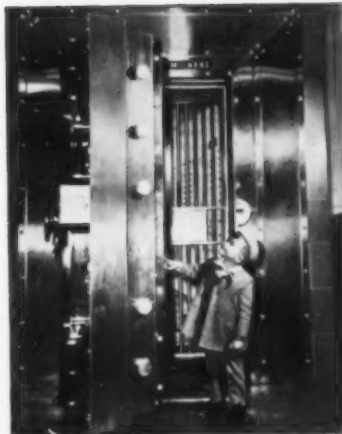
This is an admirable summary of a

* Cassell, 45s., 2 vols.

People Products Places-2

PRECISION PROVED—

At the Trade Fair in Toronto, a three-year-old Canadian provides a remarkable demonstration of high-precision workmanship as, with one finger, he opens a seven-ton vault door exhibited by a British firm.



RENEWING PENSION BOOKS—

Claimed to be the first of their kind in the world, these book printer machines were recently installed in the Newcastle office of the Ministry of Pensions and National Insurance. From information contained on punched cards, they will automatically print the holder's number, name and address on the cover of the pension book.

SPEEDING PAPER WORK—

Designed to speed-up the movement of shipping orders and other documents from one department to another, a belt conveyer system, which grips the papers between its flexible "lips," has recently been installed in the American Westinghouse Company's warehouse at East Pittsburgh. Picture shows a stockman removing a memo from the "incoming orders" box.



P.P.P. Continued ►

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growing tendency in large-scale enterprises. The big firm is often less concerned with driving its smaller competitors out of the market than it is with entering every new and related market that might hold out prospects for future development.

An article beginning on page 73 of this issue reviews progress to date in the manufacture and use of electronic computers, and looks forward to the immediate prospects. It so happens that this article provides an interesting example of the way competition is developing amongst large firms. On the one hand, the established office equipment manufacturers who build and sell calculating machines are moving into the electronic computer field, and on the other hand some of the country's leading electrical manufacturers are working on electronic computers.

No firm, on either side, aims at a monopoly of the new field, for technical progress is such a risky affair that nobody knows exactly what is the new field. But they all believe it has big prospects and they all want to compete in the race. In so doing, they add to their existing range of products and still further spread their business risks.

Letters

The Editor, *BUSINESS*
Sir,

I would like to compliment you on your recent series of articles on "How to Finance Your Business." As there does not appear to be any other concise, up-to-date survey of this topic, written from the point of view of the business man, I suggest that you might find it worth while to publish the series as a booklet.

Yours faithfully,

E. M. BLAIR, *Accountant*,
D. Meredew Ltd., Letchworth.

The Editor, *BUSINESS*
Sir,

In your editorial notes in the September issue, you refer to the position in the United States with regard to expenditure on scientific research. Your criticism of the Chancellor is surely not justified. In the case of salaries and expenses, these are all allowable in full as a charge against profits. In the case of research equipment and premises, a special first-year allowance of 60 per cent was introduced shortly after the war and is still in force. In addition, the new 20 per cent investment allowance may now be taken, making a total first-year charge of 80 per cent followed by a 10 per cent allowance in the four succeeding years.

Yours faithfully,

W. N. HILLIER, *Secretary*,
Southern Instruments Ltd.,
Camberley, Surrey.

People Products Places-3



BUSINESS EFFICIENCY EXHIBITION, 1954—

ABOVE—Alderman W. P. Jackson, C.B.E., J.P., former Lord Mayor of Manchester, who performed the opening ceremony.

LEFT—S. Gordon Sloan, president of O.A.B.E.T.A., accepts a presentation copy of the *Business Directory of Office Equipment & Appliances* from Philip R. Zimmerman, governing director of Business Publications Ltd.

BELOW—A general shot of the exhibition, in which 87 firms took part.



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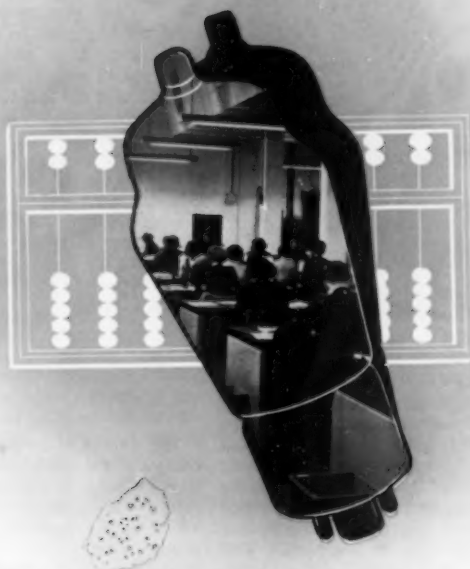
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Electronic data-processing methods are emerging from the "pioneering" stage which has restricted them to huge installations. Already in production are relatively inexpensive machines which will bring the advantages of automatic control and non-mechanical calculating speeds within the reach of a much larger number of firms. What are the facts about present equipment? What are the immediate prospects? A member of BUSINESS staff has made an intensive study of this subject. Here he tells managements—simply and fully—how to assess these new electronic techniques for use in their own firms.

ELECTRONICS in the OFFICE

A 'Business' Survey

By PETER SPOONER

THE electronic "brain," until recently the prerogative of research organizations, has made its commercial debut in a manner which has opened up immense possibilities—but placed them on an extremely remote level. For example:

In the U.S.A., a few companies like Metropolitan Life, du Pont and G.E.C. have already installed the million-dollar *Univac* computer which Remington Rand are now producing at the rate of four a month. One of them at least expects to reduce book-keeping and data-handling costs by 500,000 dollars a year.

In Britain, the "electronic office" computer on which J. Lyons and Co. Ltd. have spent £150,000 has been handling some of the company's routine clerical jobs for about nine months. Eventually, *Leo* will take over the work of between 200 and 400 clerks.

First reaction has been to hail these

developments as the forerunners of a revolutionary age of "automatic offices" and "robot clerks"; and it is in these futuristic terms that their effects on labour and the functions of management are often discussed at conferences. As a result, many businessmen are inclined to overlook the fact that the development of less spectacular—but considerably less expensive—equipment is bringing the speed and versatility of electronic calculating methods within the reach of a much larger number of firms.

Common sense rules out the possibility of an electronic "revolution," especially in a country where office mechanization has only recently received anything like adequate attention. But commercial use of relatively inexpensive electronic machines has begun and the pattern of future de-

velopments is taking shape. These facts summarize the position:

1—*Electronics are improving existing systems.* Already in use are a number of electronic multiplying and calculating punches. These machines, integrated with orthodox punched-card installations, are considerably less versatile than "real" computers—and considerably less expensive. Much faster than electro-mechanical calculators, they are tackling a variety of jobs from production control summaries to currency conversion. Their significance: (a) They show that many firms are interested in improving, rather than replacing existing installations; (b) they provide manufacturers and users with valuable experience of electronic equipment under ordinary working conditions. The same applies



the electronic brain lies in providing information which is otherwise unobtainable."

Obviously the introduction of electronic computing systems will demand (and make) important changes in methods and management; obviously these changes must be considered by businessmen at an early stage of the development period. But easy as it is to dramatize the fact that a few large computers are already handling clerical work, any assessment or forecasts must be based on more practical considerations—the capabilities of all electronic business machines, the features which distinguish them fundamentally from other types of equipment, the work which they are doing now and the work which they are likely to be doing within the next few years.

What They Can (and Cannot) Do

The powers of an electronic digital computer are easily over-estimated—some, indeed, people are inclined to regard it as a piece of scientific sorcery which solves incredibly complicated problems on its own initiative. Although technical explanations are outside the scope of this article, a brief description of the machine's capabilities and limitations will indicate its aptitude for business work.

These are its capabilities:

- 1—It can calculate at speeds very much greater than those achieved by mechanical or electro-mechanical devices.
- 2—It can carry out a large number of calculations in a pre-determined sequence.
- 3—It can vary the sequence automatically by reacting (again in a prescribed manner) to conditions which arise from its operations.

In terms of business work, these capabilities mean that the machine can perform without human intervention such routine clerical procedures as payrolls, stores control and sales invoicing. It can accept "raw" information (i.e., information on which no preliminary calculations have been made, although coding is necessary, of course), combine this with the appropriate "record" information, and reproduce the results of its computations in the form of payslips, invoices and other documents. At the same time, it can store certain data relating to

The automatic office? Not quite. But the experience gained with large computers—like the Manchester University machine developed and engineered by Ferranti—is now being applied to commercial work



to such ancillary items as electronic sorters and mark-sensing punches.

2—*Electronics will introduce new systems.* Already in production are several more versatile machines. Among them is a small all-purpose computer, costing approximately £25,000 and capable of undertaking from start to finish payroll, invoicing, inventory and other office procedures. All the punched-card equipment manufacturers are actively developing electronic equipment on this level, and two electrical engineering firms are producing medium-sized packaged computers for commercial use. At present, orthodox punched-cards are the only efficient means of handling large quantities of computer data, but magnetic tape systems (already used commercially in the U.S.A.) are being developed; so are high-speed output printers and other ancillary items.

3—*Small firms may be affected, in time,* by the introduction of professional computing services, handling either routine work or special jobs for which the customers' own staffs are inadequate. Data-processing centres are already operating—on a high level—in the U.S.A.

Deliveries of these new machines will start next year, and the manner in which they are received will undoubtedly determine the pace and pattern of

future developments. If enough firms are prepared to "introduce" electronics at an early stage, production of cheaper and more efficient machines will be accelerated; but if too many potential users decide to wait until "something even better" turns up, the waiting period may be longer than they anticipate. Manufacturers who have already spent large sums on development programmes find grounds for optimism in the amount of interest aroused by the early announcements of their plans.

What of the "repercussions" of electronic business systems on clerical labour and management? Recently, Sir Ben Lockspeiser, Secretary to the Department of Scientific and Industrial Research, told members of the Office Appliance and Business Equipment Trades Association: "These multi-purpose electronic machines foreshadow a large reduction in the size of our future clerical labour force." It is impossible to disregard such implications; equally, it is easy to make too much of them.

Efficiency—and Economy

American companies with electronic installations report: (1) many of the "displaced" clerks are now employed on the preparation of computer-data; (2) the real value of the machines is that they enable larger amounts of better work to be performed more quickly. In one respect at least, their experience bears out Sir Ben's subsequent remarks: "A good deal of intelligent guessing by management will be replaced by exact information, and this is bound to bring efficiency to the direction of a business and economy to business practices. The real future of

these computations and subsequently produce analyses of its own work, either punching them into cards or printing them out on a tabulator.

What the machine cannot do—in any sense of the word—is “plan” its own operations. Certainly it can “decide” at any stage of a calculation which of two or more contingencies has arisen and act accordingly; but the contingencies themselves, and the action which follows, must have been stipulated by a set of precise instructions (the programme) fed into the machine before the work starts.

Such “decisions” are invariably made by testing whether the result of a certain calculation is positive or negative. During an invoicing procedure, for example, the machine can be instructed to compare the quantity of each order with the appropriate stock position (adjusted automatically as the work progresses) before deciding whether or not to prepare an invoice.

Theoretically, these powers of discrimination can be extended indefinitely; in practice, they are limited by the construction of the machine. Some attempt must be made, therefore, to classify electronic calculating devices in a manner which at least indicates the range of their capabilities.

On this score, there is some confusion and, indeed, controversy. In the U.S.A. especially, there is a tendency to apply the term “computer” to all such devices—a practice which avoids contentious definitions but hardly suggests that the difference between an electronic multiplying punch and *Univac* is more than a question of size and expense.

Scientists generally agree that an important characteristic of a computer is its ability to modify its own working instructions—for example, to change “add x to the contents of storage position 1” to “add x to the contents of storage position 2.” In this way, the machine is able to carry out, without human intervention, more operations than are actually stored in it at any time, and thus undertake complicated procedures involving many possible courses of action.

Calculating punches have powers of discrimination, too. But in their case the choice is only between various fixed stages of the programme (generally set up on a plugboard), and this inevitably restricts the number of variations which can be prescribed. Nevertheless, this method of programming is sufficiently flexible to enable such machines to undertake a variety of jobs, including gross to net wage calculations, stores control with average

pricing, and the calculation of bonus factors.

Another important distinction is that a calculating punch is invariably a unit of an installation, punching the results of its calculations into the factor cards or into a new pack (from which they can be tabulated in a separate operation), whereas a computer is a complete installation handling procedures virtually from start to finish.

Basically, a computer is composed of five main units:

- 1—A method of feeding (coded) words and numbers into the machine.
- 2—An arithmetic unit.
- 3—A store, in which programme instructions and the results of calculations are held until they are needed. (The most “popular” type of storage is a magazine drum rotating at high speed, data being “read” from it or “written” on it on much the same principle as that of a standard tape-recorder.)
- 4—A control unit which co-ordinates the functions of the other units.
- 5—A method of reproducing the results of computations in a readable form.

Although digital computers are able to solve complicated scientific and mathematical problems at high speed, their performance on simple business arithmetic—which invariably involves handling large quantities of data—is often less assured. Practically all the difficulties of adapting such machines for commercial use are concerned with

speeding-up the input and output systems and with developing more extensive (and more “flexible”) storage facilities.

Punched cards have solved many of these difficulties. One obvious advantage is that the data can be prepared, sorted (and, in an emergency, processed) on existing equipment. Mark-sensed cards can be used as the input medium, thus allowing the mechanized process to start, in some applications, with essential basic documents. On the debit side, however, is the fact that the speed with which the cards themselves can be handled is considerably less than the speed with which the machine calculates.

In the U.S.A., both *Univac* and the I.B.M. 701 use a magnetic tape storage system. *Univac* has an external “memory” which comprises ten reels of half-inch wide metal tape, holding as much information, it is claimed, as can be punched into 180,000 cards; the reels, moreover, can be changed in 30 seconds.

Preparing Tapes

Random data is also fed into the machine on tape, whereas the I.B.M. machine (described in the September 1953 issue of *BUSINESS*) uses punched cards for this purpose. Various devices are available for preparing tapes, including a card-to-tape converter and a keyboard unit, similar to an electric typewriter, which simultaneously reproduces the information on paper.

Main advantage of the tape system (which is supplementary to the ma-

Smaller machines are coming. This new American desk-size machine made by Burroughs has pin-board programming and a standard keyboard input unit



Electronics —a check-list for management

Electronic methods are no panacea. Whether they are "worth-while" can be established only by studying each situation—and the new situations which will be created by their use. Here are some important considerations:

- 1—In business, speed is never the only factor which has to be taken into account. The overall cost of performing a given quantity of work is equally—often more—important.
- 2—Economic use of electronic methods depends on detailed reorganization of existing systems. Costly "idle machine" time must be avoided.
- 3—Reorganization must spread outside the "computing areas." Staff freed from routine work must be given jobs which allow them to think.
- 4—It is no use saving time on one procedure if the method creates more costly work elsewhere. Data, in the form the machine uses, must be collated efficiently—wherever possible as a by-product of other operations.
- 5—No machine can plan even the most simple procedure. Nor can it work efficiently if programmed inefficiently. Electronic methods entail more thinking by fewer people.
- 6—Management must decide what results it wants—and how much these are worth. Electronic machines' ability to process vast quantities of data can be a snare. The value of their work must be measured by the use that is made of the information so produced.

chines' internal memory devices and represents, in fact, a method of feeding record data into the machine) is that the "contents" can be kept up-to-date by erasing old information and recording new information; this function is performed automatically as the work progresses.

Similar systems will undoubtedly appear in Britain in due course. One manufacturer is developing a system of recording data on magnetic film, using standard 35mm. stock coated with a magnetic oxide. In this case, the speed of the film will be quite slow, random searching for information being obviated by the fact that the additional data fed into the machine on perforated tape will be "edited" to match the contents of the store. Only the question of reliability—prime consideration in any business application—is holding up this development at present.

Perforated Tape

Perforated tape input, although relatively slow, has some advantages, one of them being that, in certain procedures, it will be possible to use in its original form information received by an orthodox teleprinter system.

It should be made clear that any of these input systems can be combined. In the Leo installation, for example, fixed and brought-forward information is held on punched cards, while original information is fed into the computer on perforated paper tapes.

What British Makers Offer

So much for the principles of electronic data-processing equipment; now for the manner in which they are being applied. Described below are the machines which are available in Britain at present, or which have been put into production by British manufacturers and will make their debut within the next 12 months.

The British Tabulating Machine Company have followed the "standard" pattern of evolution of their electronic equipment. Within a period of two years they have produced an electronic multiplying punch, an electronic calculator (capable of performing all four arithmetical operations in a predetermined sequence) and a small general-purpose computer.

The company's new calculator uses a gang punch as its input and output mechanism. Through a combination of switches and control-panel plugging, programmes of up to 36 steps can be undertaken, the results being punched into the original factor cards or into a new pack (or both) and checked automatically at a speed of 6,000 cards an hour. Maximum input is 80 digits, and the maximum product 20 digits. The machine incorporates a 100-digit store.

More impressive, of course, is the fact that the company are developing a range of small commercial computers, costing between £18,000 and £25,000. The first version of *Hec* has already been publicly demonstrated, and is intended primarily for scientific and special purposes, although it has satisfactorily carried out a number of business programmes. A new version, designed for general commercial work, is now in production, and the first model should be on the market next year.

Purpose of this machine is to provide a self-contained accounting and calculating system. The complete installation will consist of four units: gang-punch, computer, control desk and tabulator. A magnetic drum of a reasonable (but economical) size will store both programme instructions and calculating data. Final results will be punched into cards or printed out—in the form required—on the tabulator.

Powers Samas are also developing a range of electronic equipment. A number of their electronic multiplying punches (*Emps*) are now being used in Britain, and some have been exported to the U.S.A. Incorporating mechanical sensing, the *Emp* can multiply, cross-add, summarize, punch the results into factor cards and check them automatically. Calculating sequences are determined by pre-set circuits, the operator switching from one to another. Normally the machine operates at a speed of 7,200 cards an hour.

A much more versatile machine, the **Powers-Samas Programme Controlled Computer**, has passed the experimental stage and will make its debut next year. Designed primarily for commercial work, it is being built to a price (probably between £12,000 and £15,000) which brings it within the reach of a relatively large number of punched-card users.

A magnetic store is being provided supported by various lightning-access stores. The machine will incorporate a special method of punched-card programming, simplified by the fact that

some of the more common "sub-routines" will be built-in, and will be able to carry out payroll, stores control and similar procedures.

The company will devise programmes for individual customers as part of their service. An important feature of the PCC will be its ability to "read" all the information on an 80-column card (using the intersensing technique, this is the equivalent of 160 columns). Thus the number of programme and factor cards will be kept as low as possible. As in the *Emp*, the speed will be 7,200 cards an hour, although the normal half-second cycle will be held up if, in the case of an involved computation, the necessary calculations are not completed within the prescribed period.

IBM United Kingdom Ltd. are already marketing three electronic machines. In Britain, however, two of them are largely restricted at present to scientific or statistical applications; these are the Type 604 calculating punch and the IBM card-programmed calculator, in which a 604 is married with a Type 421 accounting machine.

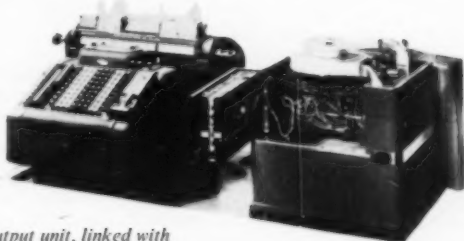
The third machine, known as the 626, is a combination of electronic calculating devices and mechanical storage. Working in either sterling or decimal factors, the 626 has a control-panel programming system, and operates at speeds of up to 4,500 cards an hour. Its 14 programme cycles may be expanded, repeated or suppressed, according to the conditions which are read from the cards or which develop while the calculations are being made. This machine can undertake the calculation of net pay from gross pay, and similar procedures. Rentals vary from £112 to £156 a month.

Elliott Bros. (London) Ltd. have put into production the 402, a medium-sized packaged computer which will cost approximately £25,000. Capable of solving complicated engineering and scientific problems, this machine has a perforated paper-tape input system and prints the results of its computations on an electric typewriter, operating at a maximum speed of ten characters a second. For the large quantities of data which make up general business work, such methods are obviously inadequate; but Elliotts are now developing a magnetic film store which, they believe, will eventually enable computers like the 402 to undertake business accounting and similar work in a particularly efficient manner. Input of random data will still be by teleprinter tape, but record data will be held on one or more reels of film,



Despite its size, IBM's 701 data-processing machine is under the supervision of only one operator at a master control unit

Magnetic tape storage systems (left) are already used in the U.S.A., and are now being developed in Britain



A perforated tape output unit, linked with a Burroughs' accounting machine, provides coded data for electronic processing

and the output system will be a high-speed line printer.

Ferranti's new medium-sized computer, the FPC-1, is in the same category. Like the 402, it is composed of standard plug-in units, has a paper tape input system and prints out its results on an electric typewriter. First model should be completed next year; at present the price is uncertain. Ferranti, too, are developing a number of ancillary items which will eventually increase the computer's versatility. These include a high-speed output printer, punched-card input and output systems and a magnetic-tape storage system.

The company's large computer, the Mark 1* (based on the machine which they developed and engineered for Manchester University) has been programmed to carry out such commercial applications as payroll computation and the automatic tabulation of market research data.

English Electric are also in the field. Already in production is their large

computer Deuce, based on the Ace Pilot model which was developed at the National Physical Laboratory and is now working in the Mathematics Division there. At present, however, this company is concerned primarily with the production of machines for scientific and industrial applications.

What These Machines Do

What sort of job will these machines do?

British experience of their commercial applications is too limited to provide more than a partial answer.

Electronic multiplying punches, introduced some three years ago, are still the only machines to be used here in any significant number. About fifty are now in service—sufficient to show the range of their capabilities.

The electronic multiplying punch is integrated with ordinary punched-card procedures. Typical is the manner in which the Automatic Telephone and



Packaged construction simplifies maintenance. This new British computer incorporates about 200 standard plug-in units in seven adjacent cabinets

Electric Company Ltd., of Liverpool, use the *Emp* in production control procedures. The machine is fed with cards which have been punched and interpreted on orthodox equipment, and from these it calculates the numbers of individual components required to make a given quantity of finished products. On this job alone, it saves 42 working hours a month. The company also use it for calculating standard labour costs and appropriations, and in piecework ticket evaluation.

B.O.A.C. are using an *Emp* for currency conversion problems. At the Birmingham works of Joseph Lucas Ltd., an electronic multiplying punch helps to prepare the daily sales figures for a range of approximately 10,000 different items.

Among a number of organizations using the *Hollerith* electronic multiplier are Cadbury Bros. Ltd. (invoicing and price extensions), British Railways' London Midland Region (stores control and quantity x rate extensions) and Hawker Aircraft Ltd. (payroll and extension of job hours by rates).

Electronic calculators are rarer. A 626 calculating punch, installed this year by the Leicester Sub Area of the Midland Electricity Board, is expected to reduce billing costs by one-third and to enable the same number of clerks to prepare twice as many bills as under the old system. A similar machine is tackling payroll, tax and inventory problems at the offices of Coventry Corporation.

Computers: The only computer in Britain handling routine office work is the Lyons giant, *Leo* (fully described on page 55 of the April 1954 issue of *BUSINESS*). Of small general-purpose computers there is no operational experience. But a hypothetical case-history will indicate the manner in which one of the new machines (the commercial version of *Hec*) will deal with payroll procedures. This example assumes that the company's employees are paid on any of three systems (day-work, piecework and bonus work), and that various allowances and deductions have to be taken into account.

All the information from which the employees' earnings are calculated is held in punched cards. Each employee's "set" comprises:

1—A carry-forward and record card. This indicates the type of system on which he is paid, his tax liability, and any other conditions which affect his earnings. It also carries his cumulative totals—pay, tax, deductions, etc.—a new card being raised every time the payroll procedure is carried out.

2—A number of detail cards into which are punched daily his basic work-data. This information is taken directly from the usual departmental records; no preliminary calculations are required.

Before the procedure starts these cards are combined and sorted into the employees' numerical order. The payroll programme (also on punched-cards) is read into the computer, and

from then on the machine's behaviour is governed entirely by the instructions which it holds on its magnetic drum and by the conditions which it reads from each employee's group of cards.

If the employee is a dayworker, the machine adds together the hours which he has worked, computes his earnings, (allowing for different rates of overtime), computes any bonuses or allowances to which he is entitled, and thus arrives at his gross earnings.

A different sequence of operations is carried out if the employee is either on piecework or bonus work. In both cases, however, the machine takes into account all relevant factors.

Holiday pay, if due, is added to the employee's gross earnings, the machine making a note of the fact that his tax deductions have to be varied accordingly. After applying the full P.A.Y.E. procedure (as in any normal system), it adds together all deductions and subtracts this sum from gross earnings.

While these calculations are being made, the results are stored on the drum. Now the tabulator, using continuous stationery, prints out a pay slip, a carbon copy being taken for record purposes. Simultaneously, the employee's designation data and totals are punched into a new carry-forward and record card, for use on the next occasion.

According to the instructions which it has received, the machine holds departmental balancing information in its store. At any convenient point in the procedure, such items as coin analysis, stamp analysis and expenditure analysis can be extracted, either by direct printing out, or by summary-punching.

For the whole procedure to be carried out the cards have to be run through the machine only once. With four cards per man the operating speed is likely to be in the region of 600 pay-slips an hour.

Supervision: No Major Problem

White-overalled technicians testing the pulses of electronic counters, mathematicians transcribing routine office jobs into algebraic formulae . . . this is how some people visualize the office of the future. So far as the small all-purpose computers are concerned, the true picture will be less dramatic and more reassuring.

One manufacturer estimates that any person who can now supervise a

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Supreme confidence in their future plans and in each other was shown by J. G. Woodruff (left) and R. F. Holland when they sold their homes, and their families shared a converted railway coach, in order that they might buy their own business

They Put an Unknown Firm on the Map

By MICHAEL MELLOR

WHEN J. G. Woodruff and R. F. Holland bought a small engineering and ironfounding business at Chichester, Sussex, they knew precisely what they were going to do with it. Believing that the advantages of entrusting "difficult" work to the full technical resources of a large company were offset by the fact that it lost its identity among thousands of job numbers, they had decided that their own policy would be to offer the best of two worlds: to combine big-firm experience with small-firm service.

At the same time, they intended to put into practice their strong beliefs about the value of real teamwork in promoting industrial efficiency.

This was six years ago. The two men—then in their middle thirties—had acquired a considerable amount of commercial and technical experience since the time when they were apprentices together. Mr. Woodruff was the works manager of a large firm of precision engineers and instrument-makers; Mr. Holland was technical adviser to the buying department of a

firm of heavy commercial vehicle manufacturers.

The business which they were taking over was of a somewhat nondescript character. It had 23 employees, was engaged mainly on rough-and-ready work for farmers, and was making only modest profits. The partners believed, however, that with patience and perseverance it could be directed into more specialized fields.

Time has justified their confidence. Today the St. Pancras Engineering

Works Ltd. has 80 employees and undertakes high-quality work for the Admiralty and a number of important companies. The turnover is five times as great as it was in 1948. Moreover, the business, still developing, has outgrown the original premises, and plans are now being made to build an additional factory on a new industrial estate.

Individually, the two men had always been attracted by the idea of going into business on their own account. It was Mr. Woodruff who made the first move. He realised that any further progress in the employment of other people would probably discourage him from putting such plans into operation—the initial drop in his income would be too powerful a deterrent. He mentioned his decision to Mr. Holland and the idea of a partnership was born.

In one respect at least, they had open minds. If they could find suitable premises in the right place, they were prepared to start from scratch; on the other hand they appreciated that it might be quicker and more certain to develop an existing business. But they were determined at all costs to avoid the main industrial areas; this, they thought, was one of the advantages of self-employment.

Their search spread over 12 months. They answered dozens of advertisements and inspected dozens of buildings. They also wrote to bank managers in a number of towns—on the principle that banks are among the first to learn of proposed business changes—and it was from one of these letters that the St. Pancras offer arose.

To raise sufficient capital, they sold

In many "popular" success stories young men take a few pounds, an ounce of experience and a ton of enthusiasm and build flourishing businesses from thin air. J. G. Woodruff and R. F. Holland waited until the enthusiasm was balanced more equally by other ingredients. When they took over a small established business at Chichester, their aim was to combine the technical and commercial experience which they had gained as executives in large companies with the individual service which a small (although then nondescript) firm could provide. This article describes how they succeeded.

everything—including their homes. Thus began a period of hard work and austerity, during which both families lived in Mr. Woodruff's holiday bungalow (a converted railway coach) on the coast near Chichester.

The partners had no intention of trying to introduce their new policy until it could be carried out with complete success. They realized that many changes, physical and psychological, would have to be made before the firm could undertake a full range of precision work. The employees, in particular, would have to be trained in new methods and, above all, they would have to develop much higher standards of craftsmanship.

It was decided, therefore, that no attempt would be made to open new markets until the full reorganization programme, financed by ruthlessly ploughing back the profits from the existing business, had been undertaken.

During the first week, the partners made a plan of the proposed lay-out. The fact that this original sketch is in all material respects a plan of the works today may be regarded as an effective indication of their incisive approach.

Aware of a rock on which many partnerships have foundered, they took the trouble to define their managerial responsibilities as precisely as possible. Much of their experience was complementary, and they decided to follow this pattern. In effect, Mr. Holland became technical director, while Mr. Woodruff assumed the duties of general manager.

Practical Training

As skilled labour was practically non-existent in the Chichester area, it was essential to provide thorough training within the firm. The danger, of course, lay in possibly giving the impression that two "gentlemen from London" were trying to show local workers how to do jobs which they already knew. This was overcome by a mixture of tact, patience and persistence, plus a willingness to explain their motives at every stage.

The "gentlemen from London" were also in the strong position of being able to demonstrate that their own knowledge of the work was far from theoretical, and that they had no intention of spending their days at office desks. It is worth recording that one of the first jobs which they undertook themselves was to paint the works' lavatories. They did this for



Fresh appearance of the exterior of the works reflects the fresh techniques which the partners brought to an established business

the very practical reason that they had no money to employ a painter.

With very few exceptions the employees began to tolerate, and then accept, the new directors' innovations. Only three skilled men had to be brought in from other areas, and this was done primarily to expedite the training of local green labour.

After two years of reorganization, the partners were ready to launch their development programme. It was only then that they began to make use of the contacts which they had established in the past. They also sent 500 letters to selected firms, drawing attention to the service which they could now provide.

Much of the work which has been obtained during the past four years is the outcome of customers' recommendations. Although the "bag" is mixed (this is, of course, deliberate) the partners have paid especial attention to the types of work with which they were closely associated in their previous jobs. Particular progress has been made in developing a non-ferrous foundry, handling aluminium alloy and all copper-based alloys, including bronze and aluminium-bronze—materials which many foundries fight shy of. Emphasis is placed on the fact that the firm can undertake short-run work which might not fit conveniently into the programmes of large foundries but which requires greater technical experience than small foundries can generally provide.

Dependability

Every effort is made to keep delivery promises. Although orders have been lost occasionally by quoting more "realistic" dates than some competitors, considerably more work has been

gained in the long run by establishing a reputation for dependability.

To overcome the limitations of their capital during this period of expansion, the partners have adopted a somewhat ruthless attitude towards the settlement of customers' accounts. Unless special arrangements are made, all accounts are payable monthly, and these terms are applied very strictly. For cash payment within seven days of invoicing (assuming that the customer has no outstanding accounts) a 2½ per cent discount is allowed. This is not added to the price in the first place, however; the partners feel that a small-profits-quick-returns policy can be justified on its own merits.

The discount system has done as much as anything to finance new business. In many cases, it is possible to pay for a batch of raw material with the money received as payment for the finished goods into which the material has been processed.

No Loose Terms

Definite dates are used in connection with all purchasing, delivery and accounting procedures; no loose terms like "urgent" or "as soon as possible" are permitted. This simplifies office routines by making progressing virtually automatic. It also has the advantage of providing a realistic picture of all activities.

This outlook is reflected in the size of the firm's despatch department—little more than a few shelves in the main entrance. Invariably goods are sent off within a few hours of being completed.

Behind the firm's commercial and technical development (but by no means disassociated from it) lies the partners' determination to adopt a

progressive policy towards their workers. Both have strong views on this subject: their aims have been to make employment in the firm as attractive as possible and to develop what is really implied by the rather hackneyed term "team spirit".

After the end of the third year, they decided to distribute a proportion of the profits in the form of bonuses. Individual amounts were based on length of service and normal wage-rates, the two simple factors by which an employee's contribution to the development programme could be measured.

Bonuses were paid in two instalments, one just before the summer holidays and the other just before Christmas. On each occasion, an employee who had been with the firm since 1948 received about the equivalent of a week's wages. Although no formal scheme has been introduced, similar payments have been made subsequently.

Individual production bonuses are paid wherever practicable. A "reasonable" time is fixed for a particular job; if by hard work the operator finishes it more quickly, he receives about 50 per cent of the money thus saved.

A contributory pensions scheme has just been introduced. Before taking this step, however, the directors explained the pros and cons of the scheme at a meeting of all employees, emphasizing that it was not intended as a means of "holding" men who might otherwise leave. The employees were then asked whether or not they wanted the scheme. They all did. Following the "team" principle, the pension scheme applies to both hourly-paid workers and staff.

When Mr. Woodruff and Mr. Holland were planning their development programme, they decided that they would not allow the number of employees to exceed 80. Experience has taught them, however, that it is sometimes more difficult to stand still than to make progress; moreover, they realise that without progress a firm will gradually wane. So their original policy in this respect has been modified by setting up self-contained subsidiary

Four Ways of Building up a Business

- 1—Be prepared to plough back every penny of the profits from the existing business
- 2—Wait to introduce a new policy until there are means of carrying it out satisfactorily
- 3—Develop the facilities to undertake work which many competitive firms fight shy of
- 4—Make sure that customers' accounts are settled promptly so that increased output can be financed

companies to undertake fresh developments—each small enough to allow close contact between executives and workers.

The first of these, Wickley Ltd., was formed about a year ago, and specializes in mechanical handling equipment. In character it differs from its parent; the latter undertakes work to the customers' specifications, the former is concerned primarily with selling ideas.

No attempt is being made to compete with established manufacturers of "standard" equipment. Already, in fact, the term "mechanical handling" has been interpreted in an unorthodox manner. In a public house one evening, the partners overheard farmers

complaining about the cost of pig weighers, and they promptly decided to enter this market. But before they started to design their equipment (with the co-operation of a local pig-breeder) they set themselves a price target and a sales slogan: *A pig weigher for less than £20.*

The Wickley weigher (£19. 18s. ex-works) was introduced just before Christmas. Since then, more than 700 have been sold. At present, production is being undertaken by the parent company in a separate welding and sheet metal shop.

One drawback of the weigher's success is that it has held up the development of other Wickley products: an inexpensive swarf truck, a bar carrier, and lightweight metal markers for road repair work. Understandably, however, the partners have displayed a healthy disinclination to allow plans to interfere with opportunities.

A second subsidiary, Hollywood Ltd., is in the process of being formed. This will specialize in the production of precision castings employing shell-moulding and gravity die-casting techniques.

Also under consideration (although no definite plans have yet emerged) is the possibility of starting a Canadian subsidiary on similar lines. Here again, the proposal is being approached from two angles. In the first place, it is regarded as a means of overcoming the prohibitive cost of exporting the firm's products; in the second, as a means of providing new opportunities for skilled employees, who would thus be given the chance to spend short tours of duty in Canada.

Craftsmanship and teamwork are two ingredients of their success. But to these must be added a third—their executive experience had taught the partners that there were great prospects for a firm which specialised in certain types of non-ferrous precision casting



Management at Work

CHOOSE YOUR SHIFT

THE search for higher productivity without large-scale capital re-equipment has compelled British industry to examine seriously the possibility of extending shift work. The businessman who contemplates using a shift system must consider carefully which system will best suit his needs, and what are the problems likely to confront him. A recent survey by F. P. Cook,* Assistant Chief Labour Officer of Courtaulds Ltd., brings together in summarized form the existing information.

The variety of shift-work systems produced by the needs of individual industries fall into five main groups:

1—The double day-shift. This is commonly employed in textiles. Employees are divided into two groups, each working for one or two successive weeks on the morning shift, then for a similar period on the afternoon shift. Since such systems almost invariably involve women, the shift hours usually become 6 a.m. to 2 p.m. and 2 p.m. to 10 p.m., to comply with the provisions of the Employment of Women and Young Persons Act, 1936.

2—Alternating day and night shifts are popular in industries, such as engineering, where machinery can be stopped in the intervals between shifts. It involves two groups of employees, each working for a period on day hours followed by a period on nights. The system is flexible; the groups need not be the same size, nor need the rotation be fixed. For example, if only key operations were performed at night, the night shift might comprise only say one-third of the employees. In this case, each man could work "days" for two weeks and "nights" for one week, or spend a month on "days" followed by a fortnight on "nights."

3—Permanent night shifts are normally a variation of the alternating system, but they can be used in conjunction with double day-shift working. In some textile and confectionery processes, the two day shifts are worked by women and the night shift by men

(the law prohibits night work in factories by women).

4—Continuous three-shift systems are used where the production process demands continuous working. The plant is manned for the full 168 hours each week. If the average working week is 42 hours, this can be done by four groups of employees—one on the morning shift, one on the afternoon shift, one on the night shift and the fourth waiting to take its place when the groups change. These systems generally involve the highest labour costs, because the "inconvenience payments" must include enhanced wages for weekend work.

5—Discontinuous three-shift systems differ in providing a week-end break for all shifts. They are operated by three groups working successive weeks or fortnights on the morning, afternoon and night shifts. These systems can be adapted to full 168-hour processing by overtime working.

Two other systems, less conventional, have been evolved to meet the needs of certain industries.

Widely used in Lancashire are evening shifts for part-time employees. Performed between 5 and 10 p.m., they offer acceptable hours of work to trained women who have left industry for domestic reasons. They increase utilization of machinery where there is insufficient labour for full double day-shift working.

Staggered day work is useful at the peak working period for some seasonal industries, such as food preserving. Employees may be divided into (say) three groups, starting and finishing

work at intervals of one hour. This arrangement lengthens the effective working day when the crop is in season and makes use of the longer hours of daylight, at the same time avoiding excessive working hours for the individual. Electricity load-spreading has also led to variations of this system.

ACCOUNTING FOR SALES

MR. F. C. HOOPER, managing director of Schweppes Ltd., certainly knows how to make a provocative statement with complete conviction. He told his audience at the recent Summer School of the Institute of Cost and Works Accountants: "The sales manager is almost invariably a promoted salesman; and normally this is a fatal mistake. The good salesman is a genial extrovert, a likeable, acceptable person who believes in his product, who is enthusiastic, fairly simple-minded, and has a one-track mind."

"Most people like that type of man. . . . But it is usually a fatal mistake to appoint a sales manager from the ranks of these men. The sales manager must manage rather than actively sell. He must be a leader whom the people under him will respect. But much more than that, he must be a rare combination: first of all he must be able to read figures like words, as accountants do, and must be the sort of man who can use his mind on figures."

Then Mr. Hooper had a pleasant surprise for his audience when he said: "Businesses ought to look for their sales manager on the accountancy side. I would rather have a 'back room' introvert who really knew what he was at with masses of figures, than a promoted salesman who was the genial extrovert type. On the other hand, that is not all. The really good sales manager must be also a surveyor of

ACCOUNTANTS AS SALES MANAGERS?

F. C. Hooper (right), managing director of Schweppes, talking to W. E. Harrison, President of the Institute of Cost and Works Accountants



* Shift Work, by F. P. COOK (Institute of Personnel Management) 4s.

world affairs, of the affairs of industry, and of his own district."

Later, one member of the audience asked how a sales manager who had never been a salesman could impose leadership upon salesmen without their feeling that he knew nothing about selling. In reply, Mr. Hooper expressed the view that "most people do not want to be led by someone who can tell them what to do in their own job; they prefer a leader whom they can recognise as different. Problems nearly always arise when an expert is appointed to boss other experts of whom he has formerly been one."

GALLANT TEACHERS

SHELL-MEX and B.P. Ltd. have struck an unusual line in staff training with the publication of a small illustrated booklet, based on a quotation from Rudyard Kipling's story "The Elephant's Child."

*I keep six honest serving-men
(They taught me all I knew);*

*Their names are What and Why and
When*

And How and Where and Who.

The booklet depicts six knights in armour, each with an appropriate label on his shield. One of them is shown here. Extracts from the text accompanying each knight are given below:

Why. We live in a changing world. To meet its challenge we need new outlooks, new policies, new methods . . . The company must become ever more efficient and handle increasing quantities of products. This means that every member of the company ought to work ever more effectively. He should have every chance to develop his character and skill and every encouragement to do so. That is the reason for training.

Who. Education is not a nuisance we left behind at school. It is part and parcel of the very life of the world and his wife. The man (and his wife) who gets farthest in the world is the man who is never too old or too proud to learn, the man who is always "in training."

What. Our company is so large and complex that there are many different jobs and hence many different types of training and trainee. Therefore our training should be flexible. Each piece of training calls for careful preparation, for individual planning.

How. In dealing with people we should not use rigid methods. We have to consider personalities; otherwise what is in the trainer's mind will not be transmitted to the trainee. . . .

Those who train should always remember that the trainee may wish to speak. Questions and discussion must, in fact, be invited.

When. Training is a continuous process. In our contacts with our fellow men we are always learning and always teaching. . . . But the timing of particular pieces of training is important. . . . Alteration of the



One of the "six honest serving men" employed in the Shell-Mex training programme

sequence of a training programme may lead to a better timing in view of circumstances, personalities and places.

Where. Communication is at its most effective when it comes from the people who do the work in the place where the work is done. This is the essence of field training—and the field is as large as the company.

NO DAY-RELEASE

THE story of how the St. Pancras Engineering Works at Chichester was bought and developed by two former executives of well-known firms, is told on page 79 of this issue. Many of the novel attitudes and techniques they adopted are described there, but it is also worth noting that their views on apprenticeship are somewhat original, and fall outside the series of case studies presented in *BUSINESS* in September (page 57) and October (page 77). The main points of their scheme are as follows:

- 1—No boy is engaged as an apprentice, but all boys who join the firm are regarded as potential apprentices.
- 2—If, by mutual agreement, it is decided that an apprenticeship should be undertaken, the indenture is back-dated to the day the boy joined the firm—since he has in fact been training all the time.
- 3—The heads of the firm do not believe in day-release. They consider that a boy who wants to improve his technical knowledge must also show

that he possesses other qualities, such as character, determination and the will to "get on."

- 4—Apprentices are expected to attend technical college at least twice a week in the evenings. They are allowed to leave work early on these occasions. Their fares to college are paid by the firm, and if their progress at college is satisfactory, their fees are refunded in due course by the firm.

Publications Received

THE CASE METHOD AT THE HARVARD BUSINESS SCHOOL edited by M. P. McNAIR and A. C. HERSUM (McGraw-Hill) 40s. The Harvard University Graduate School of Business Administration, long famous for its pioneer use of the case study method of teaching management subjects, has now produced a book showing in detail how the method is best used. Because there are so many varieties of the method, a number of different instructors have been given opportunity to describe their own teaching techniques. This book should be of great interest to all who are concerned with executive training.

THE ART OF SALESMANSHIP by H. M. GOLDMANN (Staples) 12s. 6d. The Swedish author has trained over 12,000 salesmen for more than 100 well-known firms, including General Motors, Electrolux, Philips, Scandinavian Airlines System and Volkswagenwerk. In 15 chapters he describes in simple terms a wide variety of selling points.

HUMAN BEHAVIOUR IN INDUSTRY by W. W. FINLAY, A. Q. SARTAIN and W. M. TATE (McGraw-Hill) 32s. An introductory text to problems concerning employer-employee relations, communications up and down the chain of command, morale, incentives, discipline, responsibility and other related topics. Definitely a beginner's text, which moves quite quickly through each problem.

TECHNIQUES OF COUNSELLING by Jane Warters (McGraw-Hill) \$4.75. A fairly complete review of methods used in personnel guidance. The author's practical experience relates mainly to students, not to industrial workers.

COLUMBIA-VIKING CONCISE ENCYCLOPEDIA (Macdonald) 50s. A short edition of the well-known American work, published for the first time in Britain. Contains 31,000 items on all subjects.

THE INDIVIDUALIST by NORMAN TIPTAFT (Norman Tiptaft) 20s. The autobiography of a former Lord Mayor of Birmingham.

THE DICTIONARY OF TYPEWRITING by M. CROOKS and F. DAWSON (Pitman) 12s. 6d. The sixth edition of a well-known work.

TIMESTUDY FOR COST CONTROL by P. CARROLL (McGraw-Hill) 40s. Third edition of a simple text by an American consulting engineer. It includes an outline of basic motion timestudy.

PAPER CONVERTING AND USAGE by F. T. DAY (Trade Journals) 20s. A comprehensive and clear, though detailed text by the advertising manager of a well-known paper manufacturing firm.

THE MENNEN STORY by ALFRED LIEF (McGraw-Hill) 24s. Story of the foundation and growth of an American drug company.

SECURITY OF TENURE OF BUSINESS PREMISES (H.M.S.O.) 6d. An outline of Part II of the Landlord and Tenant Act, 1954.



Jute strands in rolls waiting to go through the finisher card

Because of the extraordinary anomalies in the wages structure of the jute industry, a Government Working Party in 1947 recommended a complete review. In 1952 the Association of Jute Spinners and Manufacturers signed an agreement with the three main unions in the industry for the gradual creation of a new system of payment, based on industry-wide job evaluation. Nearly 150 operations performed by men and over 100 by women have been evaluated, 15 different aspects of each job being taken into account. Returns for the whole industry were tabulated, and standard ratings worked out. At the same time a Protection of Earnings Award was introduced to allow those who might otherwise suffer from the new ratings to be brought very gradually into line. So far only one-fifth of the textile workers in the industry have been brought under the new scheme, but the process of conversion is a continuous and accelerating one.

HOW AN INDUSTRY CAN HELP ITS FIRMS - 4

Job Evaluation in the Jute Industry

By A. G. THOMSON

B RITAIN'S jute industry has an importance which cannot be measured solely in terms of output or of the number of workers on its payroll, for its products play an essential part in the smooth running of dozens of different industries. The principal products are yarn, cloth and bags. Approximately 40 per cent of the total yarn spun in Britain goes directly to consuming industries for uses other than in jute cloth—in carpets, fuses, cables, twines, cordage and ropes. Of the jute cloth used in the United Kingdom, about 60 per cent is woven in British factories, the balance being imported. Jute's main use, however, is in making bags, and each year more than three hundred million jute bags are required in Britain alone, mainly for the transportation of food-stuffs.

During the 120 years of its existence, this industry has experienced varying degrees of prosperity and misfortune, but never has its outlook been more progressive than at present. Since the war, without government aid, it has spent £6 million on re-equipment, and

future commitments under this heading are still very large. In relation to its size the jute industry has, in fact, spent more money on modernization in post-war years than any other natural fibre textile industry in Britain. As a result, it is in the forefront of the world's jute industries for efficiency, and is second only to Calcutta in production.

In its geographical distribution, the industry follows the pattern of other textile trades in the United Kingdom, being centred very largely in one area. Within the boundaries of Dundee itself are 93 per cent of the spinning machinery, 65 per cent of the looms and 64 per cent of the machines for bag sewing. The remaining spindles and looms are mostly in the two small neighbouring towns of Forfar and Kirriemuir, but the balance of the

sewing machines are situated for the most part in Liverpool and London.

The fact that such large percentages of the spinning and manufacturing potentials are concentrated in and around Dundee has created favourable conditions for a combined approach to matters affecting the industry as a whole. Predominantly a Dundee organization, the Association of Jute Spinners and Manufacturers represents about 92 per cent of the producing industry in Dundee and 84 per cent of the industry in the surrounding district. In dealing with such matters as labour and wages, it is in a position to act on behalf of all producing firms, and its decisions are accepted throughout the industry.

An outstanding post-war development in the industry was the formation

of the British Jute Trade Federal Council in May, 1947. The Council has sixteen members, drawn from six trade organizations representative of every section of the industry. Its functions are to promote the prosperity of the jute trade in the United Kingdom and to act as a contact between the government and the trade on matters of general interest. The Association of Jute Spinners and Manufacturers has eight representatives on this body.

One of the first tasks undertaken by the Federal Council was to study the report of a working party set up by the Government in April, 1946. After an investigation lasting 18 months this working party presented a 121-page report to the President of the Board of Trade. It contained 19 recommendations for strengthening the jute industry, most of which have been implemented. Among the measures advocated by the working party was a review of the wages structure.

There were many anomalies in the existing wages structure, due largely to a piece-rate history in which scientific methods of work study often played too small a part. A few firms had appointed industrial consultants and introduced bonus systems in which rates were related to the demands of the job, but there had been no uniform approach to the problem. Rates varied widely not only from job to job, but also from one establishment to another for the same job.

While the Association of Jute Spinners and Manufacturers were considering how the working party's recommendation could best be carried out, they were approached by the three trade unions concerned, who asked that the wages structure should be revised. There was general agreement between the association and the unions that the principle to be adopted was that of a fair wage for a fair return of work. After much discussion, it was decided that the new structure should be what was known as "base rate analysis," or the re-grading by scientific examination of all jobs in the industry.

After two years of negotiations, an agreement was signed in November, 1952, between the Association of Jute Spinners and Manufacturers, the Dundee and District Union of Jute, Flax and Other Fibre Workers, the Scottish Union of Powerloom Tenters, and the National Union of Dyers, Bleachers

Inside a circular weaving factory. Since the war the jute industry has spent £6 million on re-equipment

THE POINTS ASSESSED

Skill and Experience

- 1 Learning period
- 2 Mechanical ability
- 3 Previous experience
- 4 Complexity

Mental Requirements and Responsibility

- 1 Material or equipment
- 2 Subsequent effect
- 3 Team work
- 4 Diligence

Physical Requirements

- 1 Monotony
- 2 Abnormal position
- 3 Heaviness
- 4 Disagreeableness

Hazard

- 1 Disease
- 2 Accident
- 3 Internal Injury

and Textile Workers (Scottish District). It provided for the gradual creation of a new system of payment, tied to the essential demands of each separate occupation and the amount of work done.

The original draft happened to be bound in a pink cover. It has become customary, therefore, to refer to the agreement as the "pink book," and for convenience the same colour has been retained for the covers of all subsequent issues.

The creation of a revised wages structure on a scientific basis was carried out in three stages, two of which necessarily preceded the signing

of the agreement. As defined by the "pink book," these three phases are as follows:

- 1—Merit rating of occupations.
- 2—Translation of merit ratings into money values.
- 3—Scientific measurement of the work content of each occupation to enable the money values arrived at in phase two to be related to work done.

It was evident that this programme had to be carried out under the guidance of technical experts. The services were therefore obtained of a well-known consulting firm with an extensive knowledge of the textile industry. Throughout the introductory period, the local chief representative of this firm served as chairman of a joint committee set up by the association and the unions. An expert visited each works and convened a committee on which management, supervisors and workers were represented. The members of these committees were asked to grade every job within their establishments.

Every job in the industry was so assessed, points being awarded for various factors. The "pink book" lists nearly 150 operations performed by men and over 100 by women. The factors taken into consideration were, among others, length of training period, skill necessary, responsibility, alertness to detail, physical requirements and the industrial hazards that might occur in a particular job. In all, 15 different aspects of the job were taken into account and over 110,000 assessments were made. The returns for the whole industry were tabulated and a standard merit rating was worked out for every job.

In considering the second phase of the undertaking, namely the association of money values with the



ratings, it was ultimately decided that the general shape of the payments graph should remain as far as possible unchanged. Largely on the advice of the consultants, the basic pay curve was plotted so as to follow approximately the time grade earnings, but it was agreed that opportunity should be given under the new wages structure for a worker to earn one-third more than the basic rate when working at full bonus performance. The points earnings charts thus resolved themselves into two lines, one being the redeployed base rate and the other (one-third higher) the standard redeployed earnings under fully loaded conditions.

Male and female occupations are separately rated, the latter being less heavily loaded. Juveniles are provided with a base rate bearing the same relationship to the adult base rate for a given occupation as the juvenile minimum rate bears to the adult minimum rate. A worker performing two operations with different ratings is paid in accordance with the higher basis. Provision is made in the agreement for the payment to old or disabled workers of bonuses based on a lighter load and a modified base rate.

While most workers stood to gain by the revised wages structure, wages for some occupations had hitherto been too high and required to be adjusted downwards. In order that a worker adversely affected by re-deployment should feel the reduction as little as possible, a Protection of Earnings Award was introduced, under which at first the worker was paid sufficient extra money to raise earnings at "standard performance" to the previous level. This award was reduced every six months by 3s. 9d. per week in the case of males and 1s. 10½d. in the case of females, until it was finally liquidated.

"Holding on"

Some difficulty was experienced in arriving at a suitable rating for adequately-loaded workers who were required to accept part or all of the load of a worker temporarily absent. In some sections of the industry, it had been customary to pay those "holding on"—as it is termed—the whole of the absent worker's wages, but this practice was held to be unsound. After much discussion, a formula was found which gives workers "holding on" a special extra award calculated on bonus earnings.

All difficulties having been satisfactorily ironed out, the way was clear



Automatic flat loom weaving. One of the difficulties in creating the new payment system lay in determining a special extra award which would compensate workers "holding on" to part or all of the load of a temporarily absent colleague

for the signing of the agreement and the start of phase three, which is carried out at individual establishments. A wages structure sub-committee was appointed to interpret the general principles of the agreement and to deal with any special points of difficulty which might arise.

It is a condition of the agreement that the new wages structure shall be applied only to workers who are proved by scientific work measurement (carried out by a firm of recognised industrial consultants or by competent staff trained and approved by them) to be fully loaded and adequately deployed. The application of a scheme within any individual establishment is also conditional on its acceptance by the employer and the association on the one hand and those employees actually concerned and their signatory unions on the other hand.

There is no obligation on any member firm to apply the new wages structure in any establishment or department. Yet between 150 and 200 schemes have already been submitted to the sub-committee for approval. Of the 15,000 textile workers in the industry, not more than 3,000 have as yet been brought under the new system, but the process is a continuous and accelerating one.

One of the association's member firms reported that the application of a scheme to the sack printing section resulted in a reduction in labour of approximately 30 per cent for the same

output. The operatives obtained a 30 per cent increase in wages, but as the labour force was then only 70 per cent of the former level, this increase in wages meant that the total labour cost was still only 91 per cent of the former level. Thus, in spite of the higher wages the overall effect was a nine per cent reduction in labour cost. Workers released by redeployment were transferred to another department.

In the spring of 1954, the Association of Jute Spinners and Manufacturers were advised that application could be made for an allocation from the so-called American Counterpart Funds. The grant could be employed in promoting use of the new wages structure and in improving productivity as a whole. The funds made available by the Board of Trade were supplemented by a contribution from the association itself. They have been used to set up a full-time advisory service for the whole of the industry.

The advisory service has six main objectives:

Promotional: To endeavour to bring about uniform application of the basic principles of work study, of incentive methods and of the Jute Wages Structure Agreement (1952).

Comparison: To advise on schemes involving work measurement submitted by firms in the industry, comparing them with a view to improvement where this is possible.

Continued on page 158

BUSINESS

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FORM 7 in the Appendix to the Landlord
and Tenant (Notices) Regulations, 1954.

LANDLORD AND TENANT ACT, 1954
LANDLORD'S NOTICE TO TERMINATE BUSINESS TENANCY

To JOHN SMITH

of THE HOLLOWS, NEW TOWN, BARNETSHIRE, tenant of
premises known as 114 HIGH STREET, NEW TOWN, BARNETSHIRE.
(Insert full address)

I, WILLIAM BROWN
of 200 LONG STREET, NEW TOWN, BARNETSHIRE,
landlord (Note 7) of the above-mentioned premises, hereby give you
notice terminating your tenancy on the 1st day of OCTOBER
1955 (Note 1).

2. You are required within two months after receiving this Notice
to notify me in writing whether or not you will be willing to give up
possession of the premises on that date (Note 2).

If Your Lease Expires . . .

By P. G. LANGDON DAVIES, M.A.

An understanding of the circumstances in which he may continue in occupation after his lease has expired, is a must for every business tenant. This article sets out the main points of Part II of the Landlord and Tenant Act, 1954.

THIS new Act which came into force on October 1 introduces sweeping changes into the law of landlord and tenant. In particular, Part II of the Act contains provisions as to leases and tenancies of business premises which are of great importance and advantage to manufacturers, wholesalers and retailers who lease their premises. The Act applies to companies in the same way as to individual tenants.

The basis of the Act is security of tenure. Occupiers of business premises (with certain exceptions which will be dealt with later) are entitled to

remain after their leases have expired. And those who hold under periodic tenancies can no longer be removed in the ordinary way by notice to quit. No longer are the rights of the business tenant to be dependant upon the necessity of proving "adherent goodwill" under the system introduced by the Landlord and Tenant Act, 1927, which in practice has been found in many cases to be unrealistic and unsatisfactory.

The new Act, which is based on the Government White Paper on Leasehold Property published in January 1953, puts into effect some though not

all of the recommendations of the majority report of the Leasehold Committee which was appointed in 1948 and reported in 1950.

Premises to which the Provisions Apply

Part II of the Act applies only to property occupied for the purpose of a business carried on by the tenant, but the definition of "business" is very wide and covers not only factories, workshops, shops, offices, garages, hotels, cinemas, theatres and so on, but also such organizations as trade unions, trade associations and charities.

Certain types of business activity, which are already covered by special legislation, are excluded. These include agricultural holdings, mines, public houses and premises let together with dwellings which are protected by the Rent Acts.

The Act does not apply, however, if the tenant is carrying on the business in breach of a term in the tenancy agreement forbidding the use of the premises for business purposes, unless the landlord has acquiesced in the use. Thus, for example, a man who starts up a business in his private house will

very often find that he is breaking the terms of his lease and so cannot claim the protection of the Act as a business tenant. Where, however, business premises are let with the stipulation that they are not to be used for a particular trade, the mere fact that the tenant breaks this part of the agreement will not stop the premises from being business premises, though of course the tenant will still be liable in the ordinary way for damages or an injunction for his breach of contract and, as we shall see, the landlord may be able to obtain possession.

Continuation of Tenancies

The first and most important effect on a business tenancy is, to quote the words of the Act, that it "shall not come to an end unless terminated according to the provisions of this Part of this Act". Thus when, for example, a seven-year lease of a set of offices expires, the effect is that without anyone doing anything the letting goes on as if nothing had happened, at the same rent and on the same terms as before.

This provision is, of course, quite revolutionary. Under the 1927 Act, where the tenant could prove that, as a result of his carrying on business there, the goodwill which had attached to the premises had increased its rental value and that the sum which he would be awarded in compensation would not cover his loss if he had to move, the County Court might in certain circumstances order the landlord to grant him a new lease. Again, under the Leasehold Property (Temporary Provisions) Act, 1951, the Court was given power to order a new lease in the case of shops only. But the present Act applies to all business premises and does not depend upon any court order or application by the tenant. As we shall see, if the landlord wants possession he has to serve a notice on the tenant who may then apply to the Court for a new tenancy, and this will only be refused in certain cases.

Grounds for Possession by Landlord

There are certain grounds on which a landlord can obtain possession of the premises. These are:

1—Breach by the tenant of his obligations as to repairs and maintenance.

2—Persistent delay in paying rent.

3—Breach of covenant or other reason connected with the tenant's use or management of the property. (This gives the Court a fairly wide discretion where the tenant has broken a covenant, for example against the use of the premises for particular trades, or has otherwise made an undesirable use of the premises).

4—The fact that the Landlord has offered and is willing to provide suitable alternative accommodation on reasonable terms.

However, in each of these cases the court has a discretion.

The landlord must prove not only that the reason exists, but also that as a result "the tenant ought not to be granted a new tenancy".

In addition, there are certain cases in which the landlord may be granted possession but may have to pay compensation for disturbance to the tenant. These are:

5—Where the tenant has been sub-let part of another tenant's holding and the head landlord now wishes to relet the holding as a whole, and the landlord ought to have possession since otherwise he will suffer substantial loss. For example, where a shop is let and the tenant sub-lets the basement, when the tenant leaves the landlord may be able to recover the basement from the sub-tenant so that he can again let the shop and basement together to another tenant.

6—Where, on the termination of the tenancy, the landlord intends to demolish or reconstruct the premises or to carry out substantial work on the premises which he could not reasonably do without obtaining possession.

7—Where the landlord intends to use the premises himself either for a business or as his residence. The landlord is not able to obtain possession on this ground, however, if he has bought the premises within five years of the end of the tenant's lease. This should prevent someone who requires business premises with vacant possession from buying premises occupied by a tenant and then giving him notice on the grounds that he wants the premises himself.

The compensation to be paid to the tenant when he obtains possession on either of the grounds 5, 6 or 7 is to be the rateable value of the holding or,

if the business has been carried on for 14 years or more, twice the rateable value. This is a somewhat rule-of-thumb method of calculating the compensation, and clearly bears no relation to the actual loss which the tenant suffers by being forced to move his business. It has been found in practice, however, that in such cases it is extremely difficult to fix a sum which does justice to both sides. One advantage of having a fixed, if arbitrary, sum is that both parties know in advance what it will be.

New Tenancies Procedure

The procedure under the Act is somewhat complicated and involves a good deal of form-filling and notice-serving.

If the landlord wishes to terminate the tenancy on any of the above grounds, he must serve a notice in a prescribed form on the tenant. This must normally be served not more than twelve months nor less than six months before the date on which he seeks to get possession. The notice must state whether the landlord would oppose an application for a new tenancy and on which of the grounds set out above he would do so. The notice must also require the tenant to notify the landlord in writing within two months whether or not he will be willing to give up possession. If the tenant informs the landlord that he is not willing to give up possession, he may then apply to the Court. The application must be made not less than two months, nor more than four, after the landlord's notice.

Except in certain special circumstances, a tenant, whose original lease was for more than a year may apply for a new lease without waiting for the landlord to serve a notice to terminate. On hearing the application, the Court will refuse to grant a new tenancy if the landlord proves his grounds for possession, but otherwise will grant a new tenancy for not more than 14 years on such terms (failing agreement between the landlord and tenant) as it thinks fit. The rent under the new tenancy is to be fixed according to the present market value.

There are certain properties which are excluded from the operation of the Act. Perhaps the most important of these are factories and other premises provided by the Board of Trade under the Distribution of Industry Acts.

The Way to Promotion

By the EDITOR



E. A. PARKER, F.C.W.A., F.B.S.I.
Managing Director, Norvic Shoe Co. Ltd.

IF Ernest Albert Parker, 68-year-old managing director of the Norvic Shoe Co., had been born in a later generation, his services might well have been lost to industry. For he would almost certainly have won scholarships right through to university, and then the odds would have favoured his entry into the civil service or one of the professions.

As it was, Mr. Parker came from a modest farming family outside Norwich, and he took a job, at the age of 15 years, with Howlett and White, the shoe manufacturing firm who were later to become the parent of the Norvic group. He entered the firm as a junior clerk on the costing side, and has made costing his primary study throughout his career. He regards it as the keynote of business success, for a shoe manufacturer must not only compete in quality, style and workmanship, but also in price.

When young E. A. Parker entered the shoe manufacturing industry, Howlett and White were a firm employing about 600 people. Today, the Norvic Group employs nearly 5,000. It has six factories and a large London merchanting house, as well as another in Norwich. It has interests in South Africa, New Zealand, Australia and Ireland, and 150 retail shops in Britain. The group manufactures 3½ million shoes a year and handles altogether five million.

Although he is now managing director, E.A.P.—as he is known within the firm—would be the last to attribute the growth of the group to his own efforts. He has certainly played a substantial part in the growth and prosperity of Norvic, but the progress of the group comes from teamwork.

The career of E. A. Parker, managing director of the Norvic Shoe Co., serves to illustrate a number of the main factors which any ambitious young man should consider if he wants to climb the executive ladder. Coming from a modest farming family, Mr. Parker started work at the age of 15, as a clerk on the costing side. This article describes how and why he got rapid promotion.

Moreover, Mr. Parker would attribute much of his own success to the inspiration of Sir Ernest White, chairman during a major part of his career, and to the leadership of Sir George White before him. These were well-known public figures in Norwich (the Norvic Shoe Co. takes its name from the ancient name for Norwich, and the company's trade mark depicts the city's cathedral).

Working by day as a costing clerk, young E.A.P. was determined to complete his education by night study. He attended Norwich Technical College and learnt boot and shoe technology. He also studied accountancy.

First Step Up

At the age of 23, he became an assistant foreman in the department for cutting the uppers of shoes. Today it might be considered unusual for someone to be transferred from the office to the factory in this manner, but it was not considered unusual then, because industry was less departmentalized. Also it was felt that young E. A. Parker's knowledge of costing would be of great value in the factory—as, indeed, it proved to be. Moreover, his previous lack of factory

experience did not handicap him in his new post, for not only had he studied boot and shoe technology at night, but in his costing work he had visited the factory so frequently that he felt quite at home as an assistant foreman.

A couple of years later, he was promoted foreman. His next important move came at the age of 27 years. The company advertised for an assistant factory manager, and received 600 applications. E. A. Parker did not apply for the job as he felt that he did not have sufficient qualifications. But after the directors had been through all 600 applications, they set them aside, sent for E.A.P. and offered him the job. He proved immediately successful in this, and at the age of 29 became works manager. Then at 38 he became a director, and later joint assistant managing director. Finally he became managing director.

Such is his career in outline, but what really made him tick? Why did he move ahead so rapidly when others, relatively, stood still? He certainly had an outstanding brain, and this nearly took him out of the field of business. During his early studies, he decided he would like to become a factory inspector, and he prepared for the examinations. But when he went



As a promising young executive, Mr. Parker was sent by his firm to week-end courses on management subjects, run by the Industrial Welfare Society at Balliol College, Oxford

to his chief, Sir George White, and asked for a recommendation, Sir George said: "You will do better if you stay with us."

That was the end of the matter, and E. A. Parker gradually began to reorient his ambitions. He was a determined young man, and firmly believed that some day he would become a manager. He could not see how he could move from manager to director, because a director would need to have capital. But when he did become a manager that problem, as we shall see, solved itself, and he later reached the board room. This story is not a typical business biography because it does not describe how a successful business man built up his own firm from small beginnings. It relates how a junior clerk in a firm which was already prosperous, and owned and directed by famous men, was able to rise up the promotion ladder through the firm and become the chief executive.

Why Promotion?

First of all, how did he obtain such rapid promotion during his early twenties? A short answer is that his chief, Sir Ernest White, recognized that he had a flair for organization and management. But, having said as much, we still have to explain what this involved. To take one example, in the cutting department young E.A.P., with his knowledge of costing, was able to introduce far greater precision into the firm's estimates of what the shoes they produced would finally cost. And this was very important, for the shoe industry works on estimated prices, selling output in ad-

vance, as far as possible. In other words, E.A.P. did not just flounder along as "the man in charge" of a certain department — he showed quickly that he knew what he was about, that he thought about his work and that he was able to improve on it.

Second, Mr. Parker was a great believer in informal chats with the workers. He had a close appreciation of the other fellow's viewpoint, and whenever there was anything wrong, he could get down to the facts of the matter and avoid any appearance of "standing-off" as a boss apart from his men. In fact his ability to get along with the workers has been very widely recognized and respected in Norwich, and he ultimately became president of the Norwich Arbitration Board. As the appointment of president is made by the trade union side of

the Board, this was no small honour.

A third factor which helped E.A.P. was the recognition he received from Sir Ernest White. Sir Ernest could see that this young man had ability, and sent him to Industrial Welfare Society week-end courses at Balliol College, Oxford, so that he could widen his understanding of management problems. To those who think of management studies as modern, it is sobering to recall that all this happened 30 to 40 years ago. One of the textbooks E.A.P. read very closely, and would still recommend, was *The Works Manager Today* by Sidney Webb, published in 1917.

Mr. Parker takes the view that no man should expect to receive an appointment and then be trained in his new job. Those who want to get ahead should be prepared to obtain their own training first, so that they will then be ready for any promotion that offers. The man at the top is continually looking for those who stand out from their fellows by having prepared themselves in advance for promotion.

As a young man, E. A. Parker took his City and Guilds certificate in boot and shoe technology. Later, he was the first to be admitted to a fellowship of the British Boot and Shoe Institution by writing a technical thesis. He is also a fellow of the Institute of Cost and Works Accountants, and in 1932 he presented a paper on "Costing in the boot and shoe industry" which was published in *Joint Transactions of the Chartered Accountant Students' Associations*.

Another factor which caused young E.A.P. to receive quick promotion was his readiness to assume responsibility.



Factors which aided Mr. Parker

- 1—Night study for professional qualifications
- 2—Use of his learning to improve on his department's work methods
- 3—Informal approach to workers, and appreciation of their viewpoint
- 4—Recognition by his employer, and help in obtaining management training
- 5—Readiness to assume responsibility
- 6—A grasp of the broad changing trends of industry
- 7—Loyalty to his employer
- 8—Interest in the study of leadership, and the advice which great leaders offer
- 9—A deep, inventive brain which keeps turning problems over until they are solved

W. A. Royce, (left) chairman of Norvic Shoe Co., and J. C. Hill of the group's South African company, discuss a sales point with Mr. Parker



Although he had not applied for the job of assistant factory manager, when it was awarded to him he immediately put his back into the work and showed the confidence to carry it through. His confidence was, of course, based largely on his technical studies and therefore on his ready grasp of what was expected of him. But it was also based on his understanding of his fellow-men.

The rise of E. A. Parker up the internal promotion ladder was helped by his grasp of the broad changing trends of industry during the past 50 years—for example, of the need for various types of management specialists and new departments, the problems of co-ordination and the problems of growth itself. And, as indicated earlier, he has also been ready to acknowledge the growing importance of the trade union movement and the necessity of giving full consideration to the workers' viewpoint in all management matters.

Also, he has been quick to grasp the changing pattern of world trade. He recognized the need for the boot and shoe industry to keep up with changing overseas fashions, and to compete more effectively in overseas markets—as it does today, although it did not in the immediate post-1918 years. In 1931, he went to the United States to study American manufacturing processes, and he brought home a number of innovations which he introduced to the industry here. But his trip was a two-way affair, for he also took his own ideas to America, and they were gladly received. He recognized that it was necessary to *give* in order to *receive*. This trip in 1931 was the forerunner of many made by executives of his firm, and it was also a pioneering trip so far as the boot and shoe industry was concerned.

Loyalty Paid

One factor in Mr. Parker's rise which must not be overlooked was his loyalty to his old chief, the late Sir Ernest White. In his early career, young E.A.P. had a number of outside offers of other appointments, but he got on very well with Sir Ernest White and found it a delight to work with such a liberal-minded and clear-sighted man. His services were well rewarded by his

own company and he was prepared to refuse higher salaries offered from outside in order to remain a member of such a smooth-running management team.

The warm understanding of the workers' point of view that was shown by E.A.P. himself was not unique within his own firm. His old chief and other directors also felt it to a marked degree. In 1920, they started the Norvic pension fund, which was non-contributory and provided every operative with a pension of £1 a week at the age of 65. This was very good money in those days. The pension fund run by Norvic is still the only large-scale non-contributory scheme in the industry. In 1929, the firm formed a joint works council consisting of members of the management and representatives of the employees. This was also a pioneering move in the industry.

However, it was not only from Sir Ernest White and his colleagues that the young Mr. Parker learnt his ideas and attitudes towards industrial management. He admits that he was greatly impressed by a number of other famous leading people, and was something of a "hero-worshipper," storing-up at the back of his mind the outstanding crumbs of advice offered by those he had learnt to respect—advice which might remain dormant in his mind for several years and then be recalled at a time of crisis when he had to make a quick decision. Mr. Parker recognizes that anyone who wants to become a leader must be prepared to study leadership and learn from what successful leaders have had to say.

Another measure of Mr. Parker's managerial ability lies in the fact that

he has five inventions to his credit. He thinks very deeply about his work, and has the type of mind which will not be satisfied until every outstanding problem is solved. Consequently he has developed the habit of taking a pencil and paper to bed with him. Although he is normally a good sleeper, he cannot sleep when turning over a business problem in his mind—so he then puts on his bedside light and makes notes. This may be at two or three o'clock in the morning, but when he has finished making his notes he sleeps soundly in the knowledge that his thoughts are down on paper, not to be lost again, and that when he wakes in the morning a solution for his problem lies ready to hand.

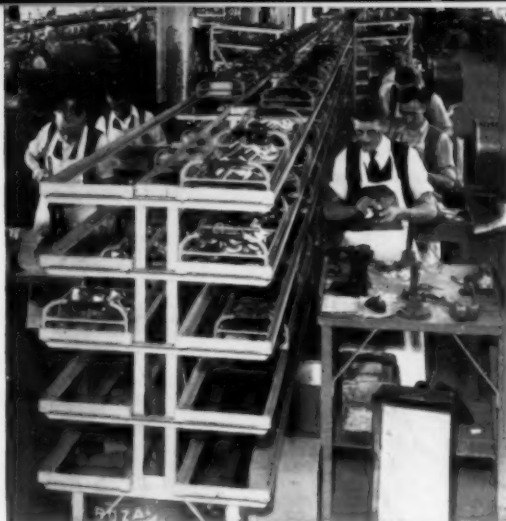
No Overtime

Although E.A.P. is a believer in bed-time note-taking, he does not like taking home a briefcase full of work left over from the office. Nor does he believe in working at the office after normal hours. He considers that this is unfair to other members of the staff who may have to remain with him, but who would be better occupied in their own family, sporting or social activities. Mr. Parker firmly believes that no executive should need to work overtime. A business firm should organize itself so that this is unnecessary.

One special form of "overtime," however, he will allow himself. This is participation in the affairs of his own industry. He has twice been President of the Norwich Boot and Shoe Manufacturers' Association, is a member of the Council of the Federation of the Boot and Shoe Industry of Great

The upper closing department, Norwich factory. His close understanding of the worker's viewpoint has helped Mr. Parker greatly in his executive work

The finishing department. Mr. Parker has organized Norvic into small producing units, described on this page



Britain and Ireland, and on their Labour and Industrial Committee. Also, he is vice-president of the British Boot and Shoe Institution, and was for some time chairman of the Norwich City College Board of Examiners. E.A.P. believes that participation in the affairs of his industry can be very helpful to a business executive in widening his knowledge of business trends and enabling him to pick up ideas from other minds, as well as in putting him on friendly and sociable terms with his competitors.

Mr. Parker has organized his company into small producing units with a responsible executive at the head of each, but with no assistants to departmental heads. He was a pioneer in this type of unit specialization for manufacture, and he thinks it a bad thing to have too many bosses. But having only one head to each unit puts a definite limit on the size of unit in which command can be properly exercised. This, he believes, is all to the good.

The Norvic Group runs a scheme for training potential executives. Most of the trainees are persons spoken for by customers and other business associates who feel that Norvic is a good organization to get their sons into. Mr. Parker believes that a system of management training is absolutely essential, for although in any one department an experienced leader can pick out quite easily those of his subordinates who have potential leadership qualities, unless these potential leaders are given an opportunity to

serve in each of the main departments of the firm, or at least in a number of them, they can never obtain a broad enough picture of the firm's affairs to become good managers.

Last year the Norvic Group started using the services of management consultants. Mr. Parker believes that this is a good idea, because the management consultant, coming in from outside, is capable of seeing things which the inside executive misses through over-familiarity. If the inside man were able to give up his day-to-day tasks and specialize on making an investigation, he might be as good as the outside consultant. But he cannot very well give up his daily responsibilities, and therefore it pays to bring in an outside man occasionally.

"Outside" Men

Moreover, the outside man, being new to the firm, has to ask so many questions in order to find out what they are doing that he inevitably unearths problems and practices which the day-to-day executive takes for granted. In recent years the Norvic Group executives have themselves introduced many innovations which are at least as good as those suggested by their consultants, but the consultants have also suggested many more. Both kinds, in Mr. Parker's view, are well worth having.

E.A.P. enjoys very good health, and he regards this as an important factor in his rise to managing director. He believes that plenty of sleep and regularity of meals are important for good health. Until recently he was a regular golf player, and before the war

was a keen yachtsman on the Norfolk Broads. He never misses his holidays, but he never takes more than a fortnight at a time, because he gets bored and starts thinking of his work again.

We have described many factors which enabled Mr. Parker to rise up the managerial ladder, but we have not yet considered how he jumped from manager to director. This, to many young business executives, may look like an almost impossible hurdle. By the time they finance their own homes and other domestic items of expenditure, how are they to save up to buy even the small shareholding that is generally sufficient to qualify for a directorship—let alone a larger stake in the company?

Mr. Parker would suggest to them that when the time comes they will not find—and he did not find—this an impossible task. Of course, tax rates are higher now than they were. However, a board of directors which wants the services of a manager as a fellow-director will help him to buy shares. The leading shareholders in the Norvic Group, when it was a private company, saw the advantages not only of having Mr. Parker on the board, but also of helping him to obtain a significant shareholding interest in the firm. It was important to them that he should remain loyal to the firm and not take his services elsewhere. It was also important that, as a fellow-shareholder, he should gain or lose in step with their own gains or losses. Mr. Parker's story suggests that, for the ambitious young executive, the main obstacles to promotion lie within himself. Clear these away, and he has a good chance of going right to the boardroom.



A consignment of polythene awaiting dispatch to the converter, where it will be made into bags for a wide range of purposes



What Polythene Means to Packaging

THE buying public in Britain is today beginning to demand the higher standard of packaging which has already become a feature of daily life in the United States, and to some extent on the Continent. The result is a boom in packaging materials, including polythene.

In fact polythene is very much at the head of the boom, for this material has caused a revolution in packaging unequalled by anything since the introduction of transparent cellulose film 40 years ago.

Already Imperial Chemical Industries, who control the basic material for polythene manufacture, report sales running at the rate of £7,653,000 a year. Since commercial production started 15 years ago, the production process has been so improved that it is now possible to make 30 times as much polythene per unit volume of the expensive high-pressure plant employed (the process, as the name implies, is the polymerization of ethylene).

Latest reflection of this progress was the recent cut in the price of the I.C.I. basic material by 3d. a pound (to 3s. 2d.), followed by a similar reduction for proprietary polythene yarns. Within the next few months, I.C.I. plan to raise output by 75 per cent. to an annual rate of 35,000 tons, with a further increase to 55,000 tons by late 1956 or early 1957—and there is the prospect of more price reductions

Packaging is becoming a selling factor of increasing importance in the British market. Heading the resultant boom in packaging materials is polythene. Immensely versatile, it is already used for packing articles so diverse as sweets and aero-engines. In many applications, it has a marked superiority to other materials. This article discusses its uses and potential uses in non-technical terms.

as higher output goes hand in hand with lower manufacturing costs.

Production of transparent cellulose film for packaging is also on the increase. Britain's present production rate of about 25,000 tons a year is more than double that of pre-war. By the end of 1955, it is expected to be some 37,000 tons.

Any attempt at comparison between

By I. R. HAMILTON, M.A.

figures for the two types of material must take into account the fact that only about one-fifth of British polythene output is made into film for packaging. This proportion, of course, may increase; in America, it is already much higher.

In packaging, polythene is continually finding new applications—it is even encroaching upon fields in which hitherto bottles and cans were con-

sidered indispensable. Polythene plastic bags, sheets and bottles are becoming a familiar part of everyday life, being used for packing articles that range from mattresses, sweets and vegetables to machinery (including large aeroplane engines, small screws and components). This material is helping the packer to realise his ideal of "factory freshness" of an article when it reaches the consumer; it is doing this more effectively, and often more cheaply and attractively, than ever before.

The polythene story began in England in 1933 when research chemists of I.C.I., experimenting with the effect of high pressure on ethylene, discovered a strange white substance in the bottom of the test-tube. This discovery was followed by research into the properties of the substance—then named polythene—and shortly afterwards into ways of making it in useful quantities. Tremendous pressure was required to produce the new

plastic, and this complicated the production process. It was not until 1938 that the first ton of polythene was produced by a British pilot plant.

Commercial production began a year later—in fact, on the very day the Germans invaded Poland. Because of its invaluable properties, polythene was widely used during the war in radar, as well as for other military electronic equipment. It did not become available for civilian use until 1946.

This soft, waxy-looking plastic is so light that it floats on water, yet so tough that it will not chip, shatter or tear in normal usage. It is so flexible that it even resists breaking or cracking at sub-zero temperatures. It is waterproof, highly resistant to chemical attack and moisture vapour, and an excellent electrical insulator. Its ageing characteristics are such that it can be stored indefinitely until used, without losing any of its inherent physical properties. And it can be converted into film, flexible sheeting or any moulded solid shape desired.

A "Natural" Pack

It was therefore not long before polythene was regarded as a "natural" for packaging. The manufacturer interested in protecting food-stuffs, or other materials susceptible to bacterial attack, is particularly interested in the sterility of polythene—a property ensured by its very chemical nature and by the high temperature to which it is subjected in the extrusion process. When it is extruded in tube form, the all-important inner surface retains its complete sterility throughout any subsequent handling.

Some typical uses in which materials require protection from outside contamination are to be found in pharmaceuticals, baby foods, nylon yarns and sterile potting soil. Polythene is also



Polythene is shipped abroad as a moisture-proof wrap for a diesel engine

frequently used where the wrapped product must not be allowed to contaminate other goods, as when packing insecticides, fertilizers and other poisonous chemicals.

In the frozen foods industry, many have been quick to realise that polythene has two basic qualities which make it of prime importance to them. Firstly, there is the complete protection given against discolouration, "freezer burn" and scaring of the product, implicit in the unfailing moisture-proofness of the film under the most adverse conditions in the freezer. Secondly, there is the property, unique among barrier films, of retaining its flexibility and durability at temperatures as low as minus 50 degrees Fahrenheit.

The high resistance of the film to tearing or bursting has led to uses in the packing of machinery and parts for the motor and electronic industries. Other industries interested in this property are those packing textiles, blankets and latex pillows—in fact, all

those industries where a tough, transparent film is necessary to withstand wholesale and retail handling.

A use for polythene which has already found marked success in this country is in providing liners for metal drums, plywood and fibreboard kegs and boxes. So lined, open-ended, unlaquered metal drums can be used for corrosive substances, the liner protecting both the life of the drum and the purity of the contents. Being removable, the liners also permit the use of the last ounce of the contents. Also, in many applications, metal can now be replaced by wood or fibre, lined with polythene, to produce a better and bigger pack, and this at a weight which represents a considerable saving in transport costs. The price, too, often permits all the advantages of "one-way" or non-returnable containers.

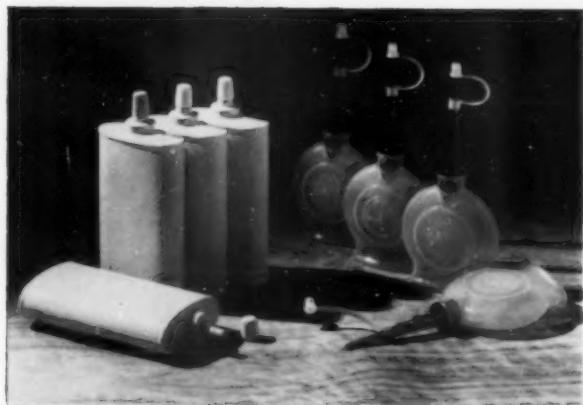
Appeal to Designers

It is not surprising, in view of the diverse properties of polythene, that the main emphasis has been placed upon its utilitarian aspects. But it should be added that the silky sleekness of the materials has appealed to many industrial designers. Polythene possesses a distinctly "luxury" appearance, and it is not unusual to find housewives and other final users washing and retaining polythene bags, because of their aesthetic appeal as well as their practical usefulness.

The moistureproof bag which keeps her purchases fresh in the shop may find new uses when the housewife takes it home. She may use it over and over again to keep food moist and fresh in the refrigerator or to keep biscuits dry

WHAT POLYTHENE CAN DO

- 1—It is light and tough, will not shatter or tear in normal usage
- 2—Very flexible, it resists breaking or cracking even at sub-zero temperatures
- 3—It is waterproof, and highly resistant to chemical attack and moisture vapour
- 4—When stored, it does not lose its inherent physical properties



Photos by courtesy of The Metal Box Co. and "Packaging"



and fresh in the cupboard. She may also use it as wrapping for sandwiches. And in summer she may pack her winter clothes away in polythene, without any fear that the moths will get at them.

An important development is the combining of polythene with other packing materials. Although there are a great many uses in which polythene can do better than these other materials, there are some in which it cannot improve on its competitors and a few which it will not meet at all. For example, among its present weaknesses are its sensitivity to some types of grease and its milky appearance.

Combined with other materials, polythene can give them the properties of waterproofness, chemical resistance and toughness. And it may be coated as well as laminated. In the field of packaging, most films and other packaging materials have some drawbacks, either mechanical or functional, but these can be minimized by coating or laminating them with polythene. For instance, a thin coat of polythene on paper makes it waterproof and chemically resistant, as well as hard to tear—a development which has produced a multi-walled paper sack with a polythene lining suitable for a wide variety of uses for which paper alone would be inadequate.

Undoubtedly there are many more uses of polythene yet to be discovered.



Finest Processed Cheese and HUNTEY & PALMER'S BISCUITS

Typical of the variety of substances which may be packed in polythene are chemicals, glues, toilet preparations, biscuits and clothing





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Fig. 1: Setting the "station indicator" which ensures that the conveyer will unload automatically in the selected factory section

How to Install Your Own Flow Production

By JOHN PARKYN

FACTORY mechanization is so often taken for granted that it is easy to forget there are still a large number of industries where the use of modern machinery and handling methods is in its infant stages, and where a firm is compelled to "pioneer" if it wishes to carry out a full-scale modernization of its plant.

It was just such a problem which, in 1945, faced S. Noton & Co. Ltd., of Walthamstow, a medium-sized firm specializing in the manufacture of suitcases and other travel goods. Noton production methods, like those of most companies in the leatherware trade, had always been firmly based on the use of small manually-operated machines and a batch production system.

At the end of the war, however, the management decided that these methods were no longer suitable. Their main reason was the huge increase in demand for suitcases—an inevitable result of the public's desire to "get away from it all" and go off on the

holidays which, in the majority of cases, had been impossible during the war.

As one of the biggest British manufacturers of travel goods, Noton's were naturally anxious to meet this new demand. And, in view of the limited factory space available—the floor area covers a little less than four acres—it was evident that this could only be done by mechanizing the entire production system.

Once the decision to go ahead on modernization of the plant had been taken, however, a whole crop of difficulties presented themselves. In the first place, investigation showed that there were no machines available which could successfully be adapted to the

Faced by the huge demand for travel goods which followed the end of the war, S. Noton & Co. Ltd. of Walthamstow decided to mechanize their entire production system. There were, however, a number of problems which first had to be solved—among them, lack of suitable machines and shortage of floor space. In describing how these difficulties were overcome, this article provides pointers for other firms wishing to instal their own flow production systems.

firm's requirements. They would, therefore, have to design their own. Secondly, the change-over would have to be planned in such a way that as few working hours as possible were lost. Thirdly, the staff would need thorough training in the new methods, and would have to be persuaded to co-operate with the design staff in the experimental stages which would necessarily precede installation of new machines. This last item was of particular importance, as many of the firm's employees, with years of service behind them, had grown accustomed to long-established methods and might not take too kindly to the drastic alterations proposed.

The first step towards a solution of

these problems, the management decided, was the formation of a development and research department. This would, of course, require the services of men who were fully experienced in the problems of designing and constructing machinery, and in the training of staff. After suitable applicants had been chosen they were made directly responsible to the board of directors, so that no time would be wasted in ratification of the necessary alterations.

The next task was for these engineers to get a full working knowledge of the system already being used, and to decide at which points the first steps towards mechanization should be made. Under the old system there was only one assembly line. This line was divided into a number of groups, each group carrying out one particular operation on *all* of the various types of suitcase in production. Movement of the cases from one part of the factory to the next was effected by hand-operated trolleys—a slow and labour-wasting system. Improvements in materials handling, however, were dependent on alterations to the actual production methods, and so the first essential was to move ahead as rapidly

as possible with the design and construction of new machines.

Late in 1945, therefore, work began on a new prototype machine—the first of many. In each case, the working methods used were roughly the same. After models of the machine had been tried and had proved satisfactory, a

full-size prototype was made and used experimentally on the factory floor. If not entirely successful, it would be returned for further revision.

The models and smaller prototypes were manufactured—under the direct supervision of the development engineer—in the company's own engineering department, but manufacture of the larger prototype machines was usually contracted-out to independent organizations, to be assembled later at the Walthamstow factory. All this work naturally involved a big strain on the resources of the engineering department, and so a number of government surplus machine tools were purchased.

Gradually, by trial and error, the switch-over to full mechanization began to take shape. Benders, jigs, formers, and other tools were designed and installed, and the operatives trained to use them. The single assembly line was broken up and replaced by seven smaller lines, each producing a particular type of suitcase. Each line is also capable of switching over to the production of other types whenever the need arises. By 1952, the change from batch to flow production had been completed, the final stage being the installation of a comprehensive system of roller, belt and overhead conveyors to replace the outdated hand-trolleys.

To appreciate the vast improvements which mechanization has achieved,

Four Stages in the Switch to Flow Production

- 1—A development and research department was formed and made directly responsible to the board of directors for the design and manufacture of new machines, and the training of operatives.
- 2—Prototype machines were built, tested and installed.
- 3—As mechanization became more widespread throughout the works, a gradual switch to flow production methods was made, and the whole of the factory split up into seven separate assembly lines, each line concentrating on one particular type of product, but each capable of conversion to any other type.
- 4—An extensive conveyer system was installed, including a 900ft. overhead conveyer which serves as a communications link between the various supply and production departments.



Fig. 2: When the supply box reaches its destination, a catch tips the loading tray and the box slides on to a chute

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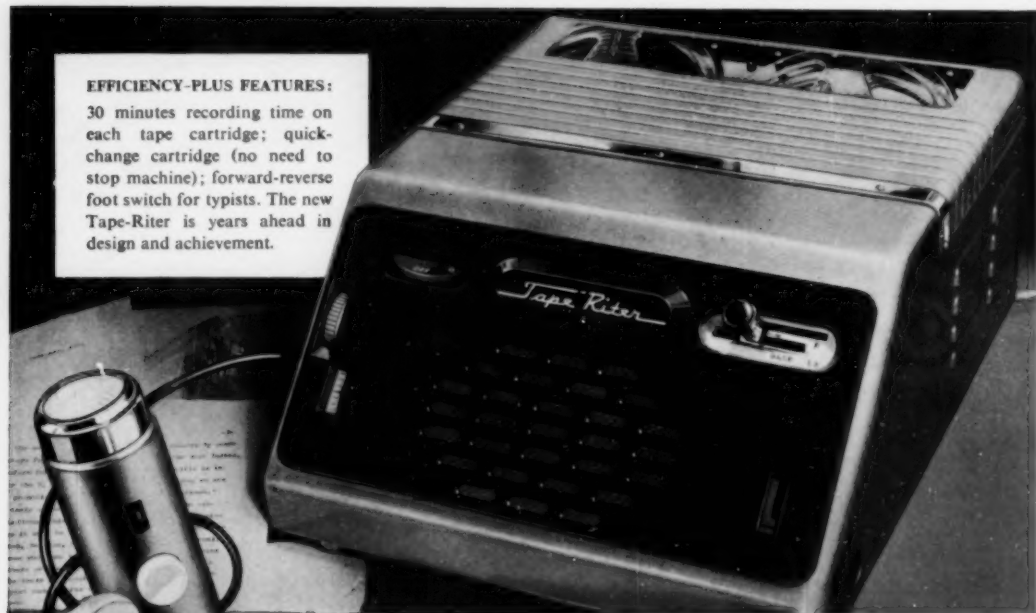
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HARTLEY ELECTROMOTIVES LTD

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Fig. 3: Because the cutting department was sealed off from the main building, a large aperture was cut in the wall to give full access to the conveyer

however, it is necessary to study the new methods in rather more detail, for here is an object-lesson in the way that a small firm manufacturing "craft" goods can design, construct and maintain a flow-production system—a system which, on a miniature scale, is equal in efficiency to the mass-production methods used by the industrial giants.

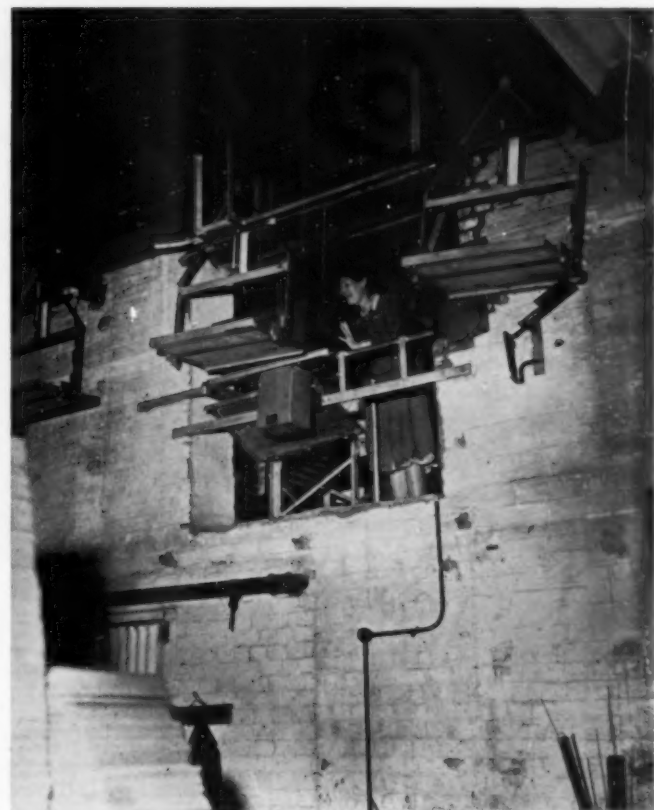
First of all, the fibre is passed through a large cutting machine. This machine will cut the material to any required size, and so is capable of serving all seven assembly lines. After cutting, the material is shaped in a high-speed shaping machine, and then passed down the line from one operative to the next by roller conveyer, until it emerges at the end of the line, sewn, lined, and fitted with all accessories such as locks and handles. It has also been inspected and packed ready for immediate despatch. Each operation is executed by a different worker, and to speed-up the rate of progress of each suitcase, the "body" and the lid are constructed on two separate sub-assembly lines, running side by side, and then are fitted together at a point farther down the line. After completion, the suitcases are taken by belt conveyer to the despatch department, where they are stored until ready to leave the factory.

Apart from the installation of the new machines and the reorganization of the factory layout, the most interesting feature of the works is the new overhead monorail conveyer. This is used to link the various supply and production departments, and covers some 900 feet as it moves round slowly in a circular tour of the entire building.

Conveyer System

The conveyer is fitted with loading trays, on which can be placed supply boxes for holding materials and component parts, such as handles, locks and steel "strengtheners" for suitcase corners. By this means, there is a minimum of delay and waste of labour in getting the supplies needed by each section from the stores department.

The system used to make an order for fresh supplies is simple but effective. Small tubular containers, similar to the ones used as inter-departmental links in large stores, can be clipped on to the loading trays. When a con-



tainer passes through the stores department it will automatically drop into an "order box", and a bell then rings to let the stores manager know that an order is awaiting him.

To enable the supplies box containing the required items to be sent by overhead conveyer to the correct department, there are some ten "loading stations," each one serving a particular section in the factory. By pressing down a "station indicator" fitted above the loading tray until the pointer is facing the number of the appropriate loading station (Fig. 1), the stores manager can be sure that the supplies box will be automatically removed from the loading tray when that station is reached. This is effected by a small catch which momentarily tips the tray on its side so that the box slides on to a chute (Fig. 2).

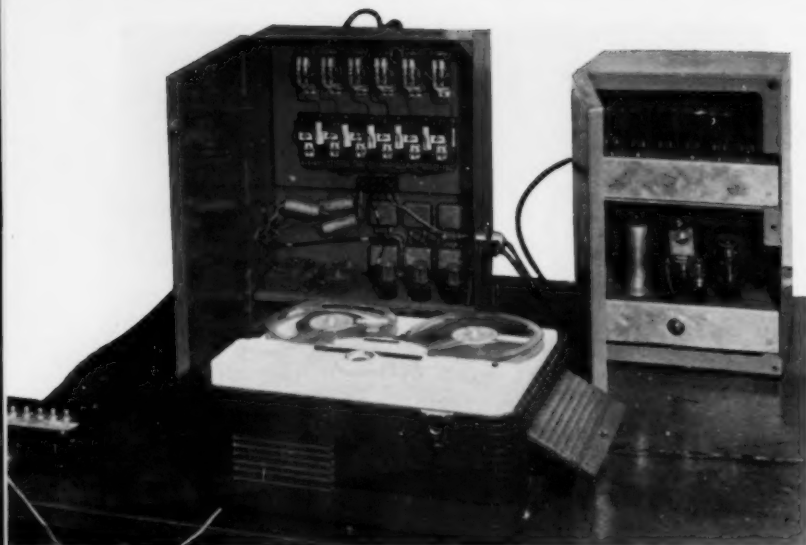
The conveyer is also used to transport materials to and from the cutting department. As this department is housed in a small enclosed balcony at one end of the building, a large aperture was cut in the side of the wall

(Fig. 3), thus enabling boxes to be placed on, or removed from, the loading trays, which are on the same height as the balcony floor.

What has mechanization already achieved at the Noton works? It is significant that bonus earnings now average about 30 per cent of total wages—a much higher figure than in 1945. At the same time, the improved production techniques have enabled the firm to reduce their prices, increase their output and build up the biggest export trade in their history.

Employees' Attitude

A final point of interest is the attitude of the operatives towards the introduction of what, in the leatherware business, can only be described as "revolutionary" methods. Fortunately, despite the fears mentioned earlier, the management found their employees only too willing to co-operate, especially in view of the substantial increase in bonus earnings which the new system made possible.



SIMPLE—AND STANDARD: Outstanding feature of the Herbert magnetic-tape control system is simplicity. The prototype uses a standard recorder

A single-purpose machine tool can undertake a variety of work when its operating cycles are controlled by a new system using simple magnetic tape recording equipment. "Instructions" are automatically recorded by the setter under normal workshop conditions; when played back they reproduce the original machine movements in the correct sequence

This Machine Control System Will Aid Work Planning

By ALAN PETERS

RECENT developments in the automatic control of machine tools indicate that manufacturers will soon be able to undertake many types of short-run work far more quickly and economically than at present. By using magnetic tape as a means of recording and reproducing actual machining operations, it will be possible to increase considerably the versatility of machines whose functions are now governed by orthodox electrical methods.

Much of the research into magnetic tape control has been of a somewhat complex nature. An example is the system which has been developed over the past two years by the research laboratories of Ferranti Ltd., mentioned briefly in *BUSINESS*, April 1954, page 53.

In this case the basic dimensions of a new component, interspersed with machining "instructions," are punched into paper tape and fed into a digital computer. Calculating the precise path which the cutting tool must follow (and

expressing its calculations in the form of pulses), the computer prepares a four-track magnetic tape which controls both the machine's behaviour and the dimensions of the work.

It is claimed that the Ferranti system can provide a remarkable degree of accuracy. To offset the effects of backlash and variations in oil viscosity under working conditions, the absolute dimensions are determined by measuring the movement of the worktable in relation to the body of the machine. Special diffraction gratings are used for this purpose, the relative position of the table being "read" by a photoelectric cell.

The potentialities are obvious. Since tape "programmes" are prepared mathematically by the planning department, the time and skilled labour involved in making prototypes are eliminated, and it will be possible to apply some of the techniques of mass-production to comparatively small numbers of precision components.

In the United States, experimental

work by the General Electric Company and the Massachusetts Institute of Technology has been on a similar level. Both organizations have developed systems in which dimensional data from drawings are extended and encoded on tape by digital computers. Clearly, such developments represent a positive step towards the realization of the Utopian "automatic factory."

Just as clearly, however, their application will be limited for some time by the fact that they necessitate complex and expensive equipment. Likely to be of more immediate interest to many businessmen—especially in relation to the operations of the smaller manufacturing companies—is a system of magnetic tape control which has been developed by the Factored Division of Alfred Herbert Ltd., Coventry.

Although the scope of this system is relatively modest, it has the advantage of simplicity. Even in the prototype form, the equipment, including a standard commercial tape-recorder, represents an outlay comparable with the cost of more orthodox forms of control equipment.

The system can be applied satisfac-

"Excellent for Efficiency"



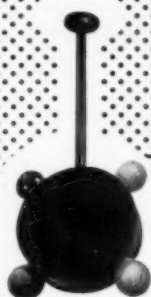
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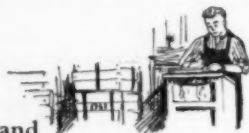


the Customers' Confirmations, taking a copy for the travellers.



Elsie sees to the Works Orders — we

can't type them together — the forms are different. When goods are ready for despatch, Bert makes out the Despatch



Notes in triplicate — customer's copy, signature copy and

invoicing copy — Sid sees to the labelling.



Of course

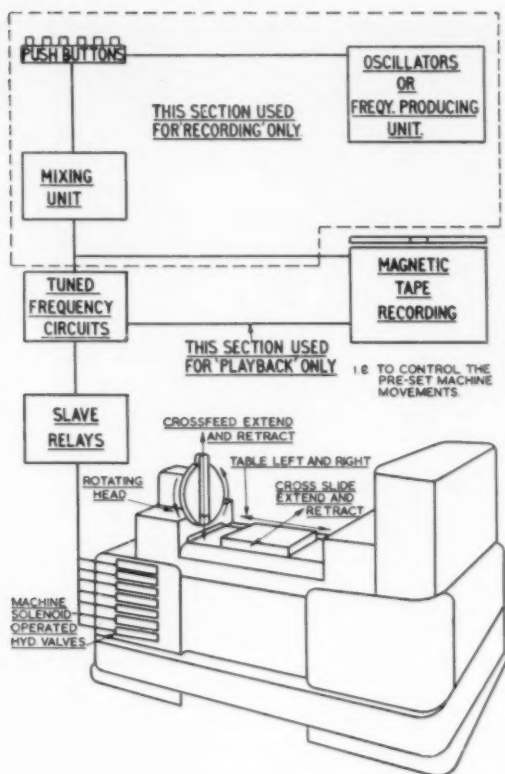
the invoice typist gets a bit inundated at times but seems to 'make out' alright.

No! I don't see where we can save much time."



An extreme case perhaps, but ECONOSET Continuous Stationery and the ECONOJET typewriter attachment can provide an answer to this, and even more complex problems.

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MASTER AND SERVANT: Schematic layout of the Herbert magnetic-tape control system (left) as applied to a Heald fine boring machine (above). Once a machining programme has been recorded, only the "playback" section of the system is employed for repetitions. Apart from elimination of some controls, the machine is unmodified.

torily to any machine in which the movement of the slides, etc. is actuated by solenoids, magnetic clutches, servo motors and other electro-responsive devices. To demonstrate its possibilities, following successful experiments with Meccano-type models, the company are using a Heald Borematic fine boring machine.

Most machines of this type have only one operating cycle. The electrical circuits are intricate (for safety, all relays and limit switches have to be interlocked) and changing the cycle is a major operation which may take as long as three or four weeks. For this reason they are generally regarded as single-purpose machines, and the work has to be loaded accordingly.

The magnetic tape system would convert them into multi-purpose machines on which could be reproduced automatically any sequence of operations within the capabilities of their slides and other elements. Radical changes in the nature of the work would necessitate re-tooling, of course; but this is a much more simple task than re-wiring the conventional elec-

trical control circuit, and the time involved would seldom exceed a few hours.

It follows, therefore, that if several single-purpose machines were converted in this manner the factory would be in a better position to accept either new work or variations in the design of existing work. Moreover, it should be possible to reduce considerably the idle machine time which is often unavoidable at present.

Other features of the system are:

1 For reasons of economy and simplicity, the tape signals control only machine functions. They tell the machine what to do and for how long to do it, but the dimensions of the work are governed by the mechanical deadstops with which the Borematic is already fitted. In other words, the intrinsic accuracy of the machine is neither increased nor decreased by applying the system.

2 All operating instructions for the various movements are recorded on one magnetic track. Thus there is no danger of "lost" signals causing

spoiled work; a defect in the playback head automatically stops all functions of the machine.

3 The tape "programme" is produced under workshop conditions. No computations are involved in this system; the machine-setter works from the dimensions on ordinary drawings.

4 While a programme is being prepared, full advantage can be taken of the flexibility of tape-recording techniques, as exploited in office dictating machines. Errors can be erased immediately; there is no need to abandon the whole sequence and go back to the beginning. Complicated sequences can be broken down into individual movements, the recorder being stopped after each while the next is planned and the tools are finally adjusted. If desired, the tape can be edited later with a pair of scissors to eliminate unnecessary movements.

The simplicity of the system is largely due to the fact that the programme is recorded automatically while the setter carries out his work in a normal manner. During this stage, the machine is controlled through the original push-button unit. Depressing a button produces the appropriate machine movement, and also causes a distinctive signal (a sustained audio frequency) to be recorded on the tape. When the tape is rewound and played back, these signals reproduce the original movements in their correct sequence without further attention from the operator.

Before the procedure is described in greater detail, a brief explanation of

Continued on page 156



This "mechanical scribe" will select any item on a "master" works order and run off the necessary job slip.

When the managing director of the Pearlite Box Co. Ltd. led a productivity team to the United States, he was impressed by their office systems and mechanization as much as by the modern working of the factories. On his return, he introduced new methods and bought new equipment—including spirit duplicators, punched card equipment and accounting machines. The company's new production system uses a minimum of clerical labour and the information passed to the factories is red hot news.

An Efficient Factory Demands an Efficient Office

DOUGLAS JAMES, managing director of the Pearlite Box Co. Ltd. of London and Manchester, manufacturers of moisture-proof cardboard containers, has good reason to thank Marshall Aid. Dollars from this fund enabled Mr. James to tour America in 1950 as leader of the Rigid Boxes and Cartons Productivity Team. During his visits to plants in Chicago, Cleveland, Philadelphia, New Jersey, New York, Ohio and Indiana, he realized that his own company was not so up-to-date as it could be. In fact, in his Productivity Team's report there was a recommendation that:

"As the United Kingdom Box Trade is badly in need of new up-to-date plant, it should be made possible for the trade to purchase some of the American plant available at short delivery dates, so that the trade can re-equip itself and become efficient and able to play its full part in the economic recovery of the country. It will be seen from the report that the use of more up-to-date plant at home would mean

anything up to 100 per cent increase in output, using, in the main, unskilled labour."

Although this recommendation referred only to the re-equipping of British firms with better plant, Mr. James also gained other impressions from his trip. For example, he formed the view that British managements tended to spend money quite readily on new plant for the factory but were apt to forget the office. Therefore, on returning to this country, he started the wheels

By JOHN A. ASH

rolling for modernizing both his office and his factory. Management consultants were called in to devise a cost control system, and a similar system has since been adopted by the British Paper Box Federation as their standard cost control.

Allied to this standard cost control is a production control system to meet

the particular needs of his factory. The main tool of this system is a spirit duplicator which enables any number of copies of specially-designed forms, with standardized layout, to be run off from master copies. These master copies contain all the information relating to a particular order, and any one item or a number of items can be selected and duplicated without reproducing the remainder. This cuts down the number of clerical staff needed. Further, all copies of forms are clearly legible—there are no hazy carbon copies.

Although most of the forms are completed in this way by the spirit duplicator, some have to be hand-written. But, as will be shown later, most of this manual work is connected with pre-production planning and involves only the heads of departments and one clerk.

On receipt of an order from a customer, estimates are extracted, and the estimate card number inserted on the order blank. The orders are then approved for credit status in the normal way. After this, an "order received" master copy is completed with name of customer, date received, order number, estimate number, description of order and any special delivery dates. The master, together with the original order and estimate, are then passed to the Order Department, where the heading information is copied on to a draft of the works order. Then the works order number and quantities of materials required are inserted on the master copy, which makes it complete. Six copies are run off on the spirit duplicator and distributed as follows:

- 1—To be filed in alphabetical order of customer's name in "uncompleted orders" file.
- 2—To be filed in date order.
- 3—Retained in the costs department

BUSINESS



Even a Child . . .

MY name's Johnny and I'm six. I haven't really got an Agaphone and this isn't my desk. But the Agaphone's so easy even I can use it. It doesn't matter if I press the wrong key—nothing goes wrong, and if I whisper into it—I can hear what I've said all over again as loud as anything. My Daddy says the Agaphone is easy to use and he likes it because it saves him lots of time. Sometimes he brings it home with him when he's busy and sometimes he uses it in his car.

Miss Brown—that's Daddy's secretary—likes the Agaphone too. She says she always gets away on time now and is never late for a date—whatever that is.

If you're as important as my Daddy, I think *you* should get an Agaphone.

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WORKS ORDER														
FORM No. 1														
ESTIMATE No.	DATE QUOTED	BOX No.	BOX TYPE	PROMISED DATE	QUANTITY	WORKS ORDER No.								
12860	1.8.50	862	L.O.L.	10.11.50	1,000	3628								
DATE	ITEM	LONG	WIDE	DEEP										
APPROVED BY	EX 6-1/2	5	1-1/2	Printed 2 colours										
	LD 6-1/2	5	1	1-lb Best Quality Design.										
DATE	CUSTOMER'S ORDER													
	12/8/51													
	CUSTOMER Messrs Good Suppliers Ltd.,													
ITEM	QUALITY	GRAIN	CALPER	SHEET SIZE	SHEETS TO BE USED	ITEM	QUALITY	GRAIN	CALPER	SHEET SIZE	SHEETS TO BE USED			
EX 1			016	30 x 35	92									
LD 1			016	30 x 30	92									
WORKS & PROGRESS COPY														
DATE	ITEM	OPERATION	CODE	ITEM	QUANTITY	MACH CODE	No. LP	PER PLAN No.	TIME					
1.11.50	1	101	EX	Guill. cut	12 - 10 x 8-1/2	101	1	300	- 20					
1.11.50	2	101	LD	Guill. cut	12 - 9 x 7-1/2	101	1							
1.2.51	3	210	LD	Print	100									
JOB SLIP														
FORM No. 2														
ESTIMATE No.	DATE QUOTED	BOX No.	BOX TYPE	PROMISED DATE	QUANTITY	WORKS ORDER No.								
12860	1.8.50	862	L.O.L.	10.11.50	1,000	3628								
DATE	ITEM	LONG	WIDE	DEEP										
APPROVED BY	EX 6-1/2	5	1-1/2	Printed 2 colours										
	LD 6-1/2	5	1	1-lb Best Quality Design.										
DATE	CUSTOMER'S ORDER													
	12/8/51													
	CUSTOMER Messrs Good Suppliers Ltd.,													
ITEM	QUALITY	GRAIN	CALPER	SHEET SIZE	SHEETS TO BE USED	ITEM	QUALITY	GRAIN	CALPER	SHEET SIZE	SHEETS TO BE USED			
EX 1			016	30 x 35	92									
LD 1			016	30 x 30	92									
INSTRUCTIONS														
DATE	ITEM	OPERATION	CODE	ITEM	QUANTITY	MACH CODE	No. LP	PER PLAN No.	TIME					
1.11.50	1	101	EX	Guill. cut	12 - 10 x 8-1/2	101	1	300	- 20					
QUANTITY RECEIVED														
WORKED														
TOTAL WAGE														
1 05														
P. 100, Road, London, N.W.25.														

The head information is repeated on each copy, but only the appropriate line or lines of works instructions

for the recording of any outstanding deliveries and balances.

- 4—To the sales representative concerned.
- 5—To the sales department, for chasing repeat orders, etc.
- 6—To the works office for the checking of materials and as advance notice of orders received.

Next, the time-table for ancillary operations is made out. The term "ancillary operations" covers any services or materials that are needed before the actual manufacturing process. Copies of works instructions for ancillary operations are duplicated from the original "order received" master. These copies are in different colours for easy identification—for example, green for the mould note and yellow for the proof note.

From these copies, heads of departments are able to work out how long their share of the job will take, so that when the ancillary operations plan comes to them, they are able to fill it in

quickly and pass it on. This plan is in the form of a time-table, headed with the works order number. It has five cross-headings which are, from left to right: date expected to start; date expected to finish; operation (such as drawings, typesetting, blocks and zincos, O.K. from customer, plates and stereotypes, inks, formes and dies); actual date started; and actual date finished.

The form is sent out to the people responsible for the various operations, who insert the times they expect to start and finish. For example, the plan is sent to the drawing office; as they are first on the list, they are given a starting date and need only enter the date they expect to finish. Next it is passed to the typesetting department, where the date on which the drawing office expected to finish is entered as the date for their own "start" and the date on which they expect to finish is added. The plan goes to all who have anything to do with the ancillary operations until the time-table is completed.

At the same time, a datal chase file

is kept. This has 365 cards, which have cross-headings for the operations already mentioned. Each card represents a day, and the file acts as a perpetual calendar. Every morning, yesterday's card is put at the back, thus revealing today's. If the drawing office expect to get their finished drawings through by (say) 8.10.54, the appropriate card is annotated: "W.O. No. 1000, Drawings." When this card comes to the front on October 8, the ancillary operations plan, Works Order No. 1000, is sent to the drawing office for them to complete the actual date started and finished. Similarly, this plan, in conjunction with the datal chase file, goes to each other department on the date that they entered in the column "expected to finish," until the whole of the preparatory work is completed.

This routine ensures that:

- 1—No ancillary operations or supplies are overlooked or delayed.
- 2—Direct productive labour can be placed to the best advantage.



Allied with the production control system is a cost control system using punched card equipment

- 3—Accurate delivery dates can be quoted.
- 4—Closer estimation of ancillary-operation costs can be made.
- 5—All interested persons are *automatically* notified that their attention is required on the appropriate dates, without the need for maintaining separate files or aids to memory.
- 6—A permanent record is available of the estimated and actual times and costs of all ancillary operations, for future reference, and of any delays that have occurred in any part of the order.

When the materials required for an order are in hand, the copy from the "uncompleted orders" file is transferred to the "completed orders" file. Thus the forms remaining in the "uncompleted orders" file are available as a composite outstanding balances record for reference. This obviates the need for extracting any orders from the file, or making any typewritten schedules of balances.

As it is not possible to be sure that all orders will be executed in the sequence received, the order department keep a separate file in "priority of manufacture" sequence. Any change of sequence in this file is made only

after consultation with the sales department and works office, who maintain an up-to-date picture of loading on their bulk planning and detail planning charts. This procedure replaces an older system, which involved order books, copies of acknowledgment of orders sent to representatives, two sets of order record cards, and advance information cards sent to the works office.

Making the Master

Once all the preparations have been completed, the works order master is made out. The heading information has already been drafted by the order department. To this are added all materials needed and instructions for each operation in the manufacturing process, with date required, operation sequence and code, machine code, standard rate per man hour and time allowed. From this master, job slips are produced on the spirit duplicator.

Each job slip contains all heading information, plus the instructions for just one operation. This is made possible because the duplicator is able to select any line of instructions and print it individually. Copies of the complete works order are also duplicated for a

works and progress copy, a costs copy and an accounts copy. Material requisitions, an advice of delivery note and a receipt for goods are also selected and duplicated from the works order master.

Operatives clock the times taken on their particular part of the job. At the end of each day, job slips are collected and given to the costs department for the extraction of costing figures.

When an order is finished and ready for dispatch, it is delivered by lorry to the customer, who keeps the advice note. The signed receipt is brought back by the driver, and from it the invoice is made out. Thus the chain of production is completed—order received, job prepared, manufactured, delivered and invoiced.

This, of course, is only a small part of the costing system which, as well as using a spirit duplicator for 90 per cent of the paperwork, also employs punched cards for detailed analysis.

Mr. James has raised his company's office administration to a high level of accuracy, in which machines do the work that would normally require many skilled clerks.

The results achieved may be listed as follows:

- 1 Management now receive a monthly control account, as compared with the annual accounts which they used to receive anything up to four months after the close of the financial year.
- 2 There is closer co-operation between departments, because each departmental head is now in a position to appreciate the others' difficulties as well as his own.
- 3 It is always known where and when direct labour can be switched with advantage, to prevent subsequent bottlenecks or to reduce idle time.
- 4 Employees appreciate the benefits of using timetables in conjunction with the detail loading boards, which give them plenty of notice of future work.
- 5 Operatives do not have to waste time referring to the foreman's copy of the works order, for each man has all the details on his own job slip.
- 6 There has been a substantial increase in productivity.

That these results have arisen from the development of an extremely efficient production control system is obvious, but the system itself has only been made possible by the use of mechanized accounting and a "mechanical scribe," the spirit duplicator.



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The new analytical-accounting machine is capable of high-speed operation. More than 7,000 insertions can be made each day

Determined to replace their manual accounting system by something more up-to-date, Mitchells and Butlers Ltd. of Birmingham finally decided on the installation of a new type of analytical-accounting machine which enables them to prepare their accounts and sales analyses simultaneously. Since then, as this article describes, their accounts staff has been substantially reduced and their accounts system completely modernized and "streamlined"

Simultaneous Accounting and Sales Analysis— with One Machine

By WILLIAM JAY

ALTHOUGH subsidiary to the main task of keeping accounts and preparing invoices, the need for an efficient system of analysing sales and payroll figures is common to most firms. In many of the smaller companies, the managing director himself knows from personal experience which lines are selling best, but where the volume of sales or purchases is large, some form of routine analysis is usually essential. It is very often done by hand, as a follow-up to the normal accounting for sales and purchases, and consequently the analysis results are considerably out-of-date by the time they are available. A machine which combines the functions of accounting and analysing should therefore be of particular interest to all companies which deal with a large volume of orders.

Invented and developed in France shortly before the end of the last war, the machine's introduction to the British market was delayed for more than eight years due to the fact that only a decimal version was available. During the past two years, however, an organization has been formed to arrange distribution of a sterling model

in this country, and to provide a full maintenance and repair service.

The first British firm to instal one of these machines was Mitchells and Butlers of Birmingham. One of the largest brewers and wine and spirit merchants in the country, Mitchells have an annual turnover of nearly £20 million. To complicate the work done by the accounts department, the company own more than 1,000 "managed houses" and sell nearly 500 brands of wines and spirits. This means that the numerous expenses incurred by each house must be recorded and analysed, and that an analysis showing the daily sales of each type of wine or spirit must also be prepared. In these circumstances it is not surprising that the management had always found a large accounts department to be essential if the work was to be got through.

Since the new machine was installed, however, the staff of the accounting and analysis section has been substantially reduced. To appreciate how these cuts have been achieved, it is

essential to know a few facts about the system previously used. In the first place, all purchase ledgers, managed house expense sheets and sales analyses were handwritten. Largely due to this fact, the wines and spirits analysis section was sometimes six to eight weeks behind with its records.

Now, however, the new machine will do all of the work in a mere fraction of the time originally taken. On the average, about 1,200 items are recorded and analysed in an hour. Work which used to take two men a whole day can now be completed by one operator in two hours—a reduction in working time of nearly 90 per cent.

The Background

An example of how Mitchells and Butlers use their machine will help to give a clearer picture of what it can do, and the ways in which it can be adapted to suit the requirements of different industries. As already mentioned, the company control about 1,000 houses, each of which has its own expenses

sheet at head office. On these sheets are recorded details of expenditure on such items as heating, lighting, glassware, furniture and so on.

Under the new system, the individual managed house expense sheet is first inserted into the machine, and a "buyer's account" sheet then placed alongside. The purchase is posted to the "buyer's account," and the machine then automatically tabulates it to, and prints it into, the appropriate expense column.

Where the machine differs from any other type lies in the fact that it will record an amount at one posting under two entirely separate headings selected from no less than 198 registers. To enable the operator to select the appropriate registers, the machine is fitted with 36 keys. These are numbered from 1 to 9 in four parallel rows, two rows being coloured blue and two red. Thus, by assigning an item to a particular register, it is possible to obtain a complete analysis.

Aid to Accounts

In Mitchells and Butlers accounts department, for example, the operator might select Register No. 25 (Blue)

for recording "heating expenses." By pressing the blue 25 each time a "heating" item is entered on a house expenses sheet, he will have, at the end of the day's run, a total of heating expenses for that day. He can then insert the nominal account card for "heating" in the machine, press the appropriate keys and have the day's total of heating expenditure entered up, and aggregated with the previous total.

Varied Analyses

The 198 registers can be put to an enormous variety of uses. Thus Mitchells and Butlers have found them invaluable in analysing the day-to-day sales of the 500 different brands of wines and spirits retailed by the company. Each of the different types is assigned a separate register number, while one register is retained as an "aggregate" adding unit. If the particular type of wine listed on the outgoing sales invoice had been assigned Register No. 15 in the Blue register block, and the "aggregate" register was No. 45 (Red), the operator would simply have to press down 15 (Blue) and 45 (Red) and enter the amount in the usual way. The machine would

then automatically record the figures under (a) the total wines and spirits aggregate for the day, and (b) the total of the particular brand.

In addition to the points already mentioned, it is worth noting that:—

- 1—Each register is capable of addition and subtraction.
- 2—While totalling from one block of registers, amounts can be transferred to registers in the other block, either in total or sub-total.
- 3—The maximum insertion capacity of each register is one penny short of £10,000 million, and the maximum positive adding capacity of each register is one penny short of £60,000 million. Subtraction capacity is £30,000 million.

A final point of interest concerns operation of the machine. Despite its exceptionally wide capacity, it is relatively simple to operate and can be mastered by an inexperienced person in a few hours. Because their previous bookkeeping staff were male, Mitchells and Butlers are using male operators in preference to women, although traditionally, operation of this type of machine is regarded as "woman's work."

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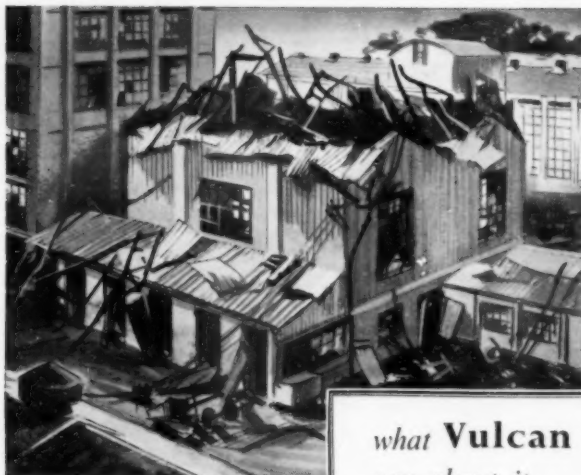
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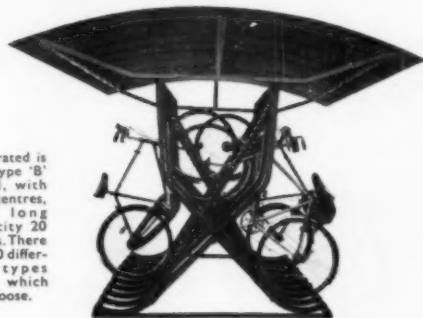
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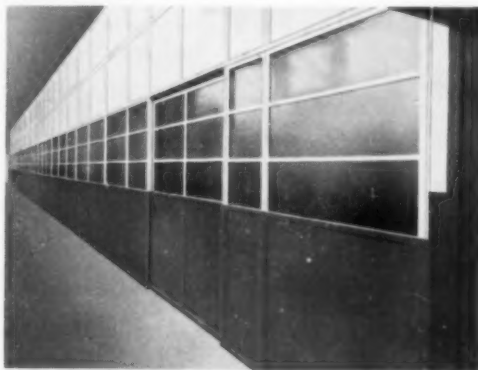
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Short Cuts to OFFICE EFFICIENCY

Simplified Supplies

IF the supply of paper, pencils and other writing accessories is badly organized, much wastage of time and energy can result. One solution to this problem is the centralization of the supply system. This is particularly suitable for large firms, where there is a considerable number of separate offices, each using a large amount of stationery.

Centralization does not necessarily mean additional expense or staff. A pre-determined quantity of each item can be kept in a large cabinet, which then acts as a "supply depot" for the whole of the office system. When a substantial quantity is withdrawn from the cabinet, an order form should be made out and despatched immediately. In this way, there is no danger of supplies running low, and paper-work is kept at a minimum.

To ensure that quantities are not withdrawn too frequently, and to provide a rapid and efficient method of distribution, each member of the office staff should be asked to make out a monthly list of his requirements. After these have been amalgamated by the stores clerk, and the necessary number

of items withdrawn from the cabinet, it is a simple matter for messengers to supply each clerk with his needs, together with his original order slip, which then acts as a check that the items asked for have been supplied.

Efficiency Tips

HERE are four suggestions for improving those small points which, time and again, slow down office efficiency.

- 1—Keep "In," "Out" and "Pending" trays as far away from each other as the desk space will allow. There is then less chance of forms getting into the wrong tray, and the work of office messengers is made easier.
- 2—Amalgamate all those loose papers into one large "miscellaneous" binder. The small amount of time and trouble involved will be well worth while when you are looking for something in a hurry.
- 3—Make more use of card index outfits for recording small items. These cards take up a minimum of desk space and relieve the strain on overcrowded desk drawers.

- 4—If the office staff of a particular department only need to use their typewriters occasionally, place all the machines on special typing desks where they are easily accessible to everyone. Machines which are found to be surplus can probably be put to better use somewhere else.

Speeding-up Correspondence

HOW many executives still find it necessary to dictate letters which acknowledge receipt of an invoice? Almost always, such letters are extremely simple in style, and the necessity of dictating them represents a complete waste of time for both the executive and his secretary. To avoid this, a specimen letter should be prepared and a copy given to each member of the secretarial staff. All the executive then has to do is to supply his secretary with the name and address of the firm, plus any other relevant details—or, better still, hand her the incoming letter—and she will be able to do the rest.

For Quick Changes

A PROBLEM facing the firm who market many lines with frequent price changes, is that of supplying staff, salesmen and representatives with up-to-date lists. Not only must it be simple and quick to produce revised

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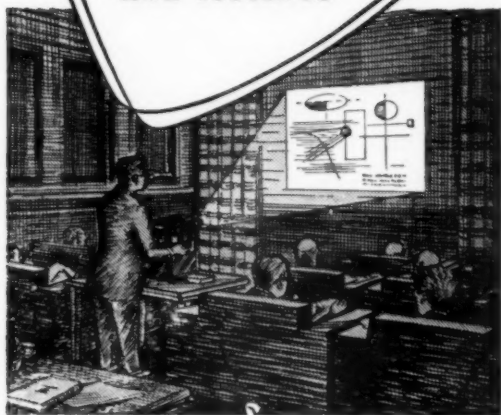


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117

lists, but some indication must be given of exactly what they replace. A West of England firm supply their salesmen with small leather ring binders into which go the price lists. These are produced—usually in two colours—very rapidly on a small spirit duplicator. A home made template cuts them to shape and a paper-drill makes the holes for slipping in the ring binder.

Each sheet is given a reference number, such as 119/93. This indicates that it is bulletin No. 119 and that it replaces bulletin No. 93. Because of the rapidity of production, the managing director also issues bulletin sheets containing sales and pep talks. Inserted in the ring binder, they act as a reminder every time the salesman has to check the price of an article.

The Right Type of Continuous Stationery

IN July (page 79) and September (page 95), *BUSINESS* published four case histories showing the advantages of using continuous stationery. There are, however, three principal types of continuous stationery. Such was the reader interest in the earlier articles that it is proposed to describe here the chief types, for the benefit of those with no previous experience in the subject, and to set out their main advantages and drawbacks. The three main types are:

1—**Fanfold continuous forms.** Made from one web of paper, folded like a fan and joined by vertical perforations at alternate sides.

2—**Interfold continuous forms.** Each continuous form is a separate strip of paper, the various carbon copies generally being distinguished by a separate tint. Sometimes the parts are held together at one or both sides by staples or gummed margin.

3—**Sprocket punched.** One variety of interfold has punched holes along the sides, to impinge on sprocket pins at each end of the typewriter platen.

In arriving at a decision as to which type should be adopted for a particular job, the following questions should be answered. (After each question there is given in italics a summarized judgment on the ability of each type—fanfold, interfold and sprocket-punched—to cope with the problem being considered.)

(a) Will the form be completed in the initial typing or is a second typing or writing necessary? *All three types can provide for second use.*

(b) Are any of the forms required to travel together after the initial typing? *All three can travel together—interfold and sprocket punched by pinning, gumming or stapling, and fanfold without any special method of fixing.*

(c) Does the same information appear on all copies or is it essential to

eliminate such items as £.s.d. or special works instructions on certain parts? *Fanfold and interfold can cope with this problem most successfully, sprocket punched being limited by the fact that each form must be the same width.*

(d) Is it essential that there should be accurate alignment between the copies in the set, so that the typewriter will register in the same place on each copy? *Sprocket-punched and fanfold provide the most accurate alignment, interfold not so accurate.*

(e) Number of copies required? *Fanfold and sprocket-punched can provide more than eight copies—interfold fewer.*

(f) Can peak loads be expedited by fitting attachments to standard typewriters in addition to any special billing machines normally used? *In all three main types, output can be increased by fitting attachments to standard typewriters.*

Because of their cost, it is often advisable to use carbon pockets and one-time carbons only to meet peak period requirements or where absolute hair-line registration is essential. A recent development in the use of interfold forms has made it possible for an operator to change individual carbons at will, to avoid discarding a complete carbon pocket when only one carbon has reached its maximum life.

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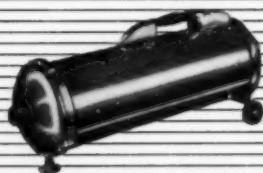
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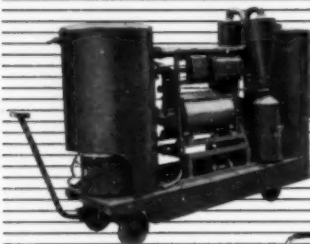
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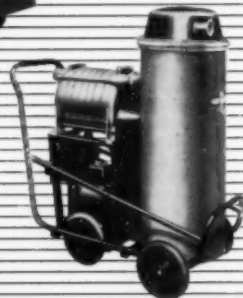
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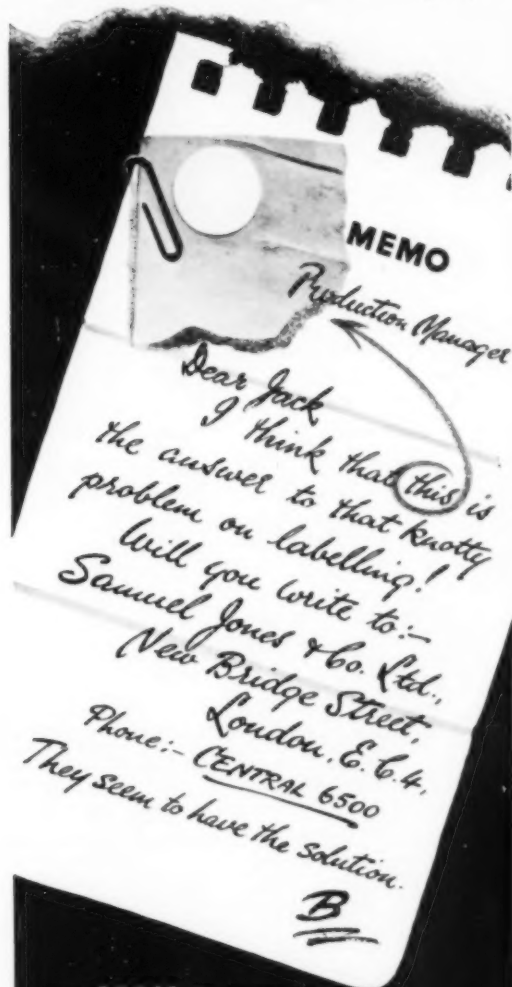
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BUSINESS

How a Hygiene Team Improves Health and Productivity

Especially in small factories, many of the health-risks to which workers are exposed are either overlooked or imperfectly controlled. Their cumulative effect on health and production is undoubtedly considerable. This article describes how the problem is tackled on a modern industrial estate



IT PAYS TO BE SURE: Testing the air in an operator's breathing-zone at the Slough works of Crane Packing Ltd.

SOME of the men in a small factory are employed on a process which involves the use of toxic materials. The management have tried to eliminate the obvious hazards, and none of the workers has complained of acute discomfort or sickness. Is it safe to assume that the contamination of the air by fumes or dust is insufficient to affect health and working efficiency?

If a hazard exists, the superficial effects (a few grumbles about "feeling tired," a slight drop in productivity, a slight rise in casual absenteeism) may have been attributed by the management to other causes. In time, routine medical examinations will disclose whether or not the health of individual employees has been affected seriously; but this may not happen until irreparable harm has been done.

Scientifically, the danger could be assessed by (1) Studying the job systematically to find out how the men work and for how long they are actually exposed to dust or fumes; (2) Collecting samples of the air under normal working conditions, analysing them in a laboratory, and comparing the results with accepted "safe" levels of contamination; and (3) Carrying out a number of specific medical tests on the men themselves.

Together, the results of these tests would indicate whether additional precautions were necessary.

Investigations of this type represent

an important aspect of the work of the occupational hygiene team which is operated by the Slough Industrial Health Service and the Occupational Health Unit of the London School of Hygiene and Tropical Medicine. Since its inception in 1950, the team—comprising a doctor, a health engineer and a chemist—has done much to improve working conditions in the heterogeneous collection of factories which make up a modern trading estate. It has also undertaken a number of investigations outside Slough, and has

By EDWARD RENNIE

given advice on specific health problems to firms in many parts of the country.

Although "occupational hygiene" has a rather formidable ring, its aims are simple: to find out how people's health and comfort are affected by the conditions in which they work, and to eliminate or reduce undesirable factors. And its relation to the work of factory doctors and medical services is established by an equally simple formula: medicine plus hygiene equals health.

Certainly it involves more scientific research than many businessmen associate with the word "hygiene." But this is applied in a realistic manner to individual problems of the type

which concern most firms. The principle is that industrial health risks cannot be controlled effectively and economically unless there are reliable methods of measuring them.

In the U.S.A., occupational hygiene has been practised extensively for many years, and the health engineer has become an important industrial figure. Almost every state provides an occupational hygiene service (naturally the scale varies) and private units have been set up within a large number of firms. One incentive has been the fact that industrial insurance rates are based on the health and safety records of individual factories, health engineers being employed as investigators by the loss-prevention departments of many insurance companies.

In Britain, however, the efforts of industrialists and others to safeguard the health of people at work have followed a more conservative pattern, which may be described (too succinctly, perhaps, to be quite fair) as a mixture of enlightenment and legislation. There has been much research into occupational hygiene problems since the 1914-18 war, but unfortunately the results have not been applied widely in industry, and it is significant that a British Occupational Hygiene Society was formed only 18 months ago. Although industrial medical facilities are generally good, the factory doctor on his own account is often unable to make accurate assessments of the health risks to which his company's employees are exposed.

Since 1945, some large industrial

organizations have introduced occupational hygiene services. But these are exceptional cases; generally, there are few facilities for investigating specific hazards in private firms.

An obvious implication is that many health-risks—especially in small factories—are either overlooked or imperfectly controlled. Indeed, it is likely that their cumulative effect on health and production is much greater than the effects of the "spectacular" health hazards investigated by the Medical Research Council and similar bodies.

For this reason the work of the Slough team is particularly significant. As a unit of the Slough Industrial Health Service, it is directly concerned with the wellbeing of about 16,000 workers in the factories and offices of the Service's 160 member-firms; and its "outside" work, limited only by the size of the team, also places the quick solution of individual problems before the demands of long-term research.

The team was formed in October, 1950, with the encouragement and financial assistance of the Nuffield Provincial Hospitals Trust. A laboratory was made available about 18 months later, when the team was incorporated in the new occupational health unit of the London School of Hygiene and Tropical Medicine, and linked with the departments of Public Health and Applied Physiology in this school.

The team's medical officer is also the Health Service's senior clinical assistant. He and the health engineer, who was sent for a period of training in occupational hygiene techniques at Harvard University, hold part-time appointments at the school. The chemist is employed on a full-time basis in the unit's laboratory.

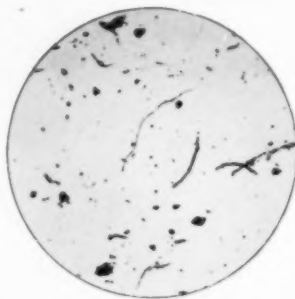
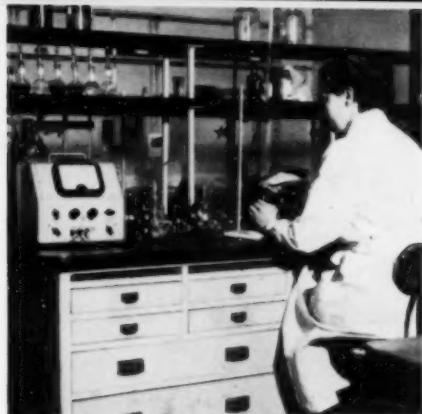
One of the factors which has facilitated the team's work on the Slough trading estate is that the door is already half-open to the application of "new" techniques. Many of the problems which it investigates arise from routine visits by other members of the Health Service's staff. Moreover, the team makes a practice of surveying conditions in the premises of all new member-firms, and this in itself helps to bring under control a number of potential hazards.

Its work may be divided into three categories:

- 1—The measurement and control of air contaminants.
- 2—The investigation of heating, lighting and ventilation problems.
- 3—Advice on all other health and safety matters.

Laboratory tests are a vital factor in the hygiene team's work. But the results are always considered in relation to on-the-spot observations of operating conditions

Below: The microscope may reveal unsuspected health-risks—in this case a concentration of asbestos dust



The third category is broad. It covers subjects as diverse as the use of radio-active materials, barrier creams, protective clothing, machine-guarding, fire protection, posture at work, noise, and the improvement of toilet and welfare facilities. Much of the team's work in this category is of an informal character.

Although the results of an investigation are disclosed only to the management concerned, the team co-operates closely with the factory inspectors, who are often responsible for drawing attention to conditions which need accurate assessment or control.

Air contamination problems account for a large proportion of the more formal investigations. A fairly wide range of toxic materials are used in the Slough factories—including lead, benzene, trichlorethylene, asbestos, chromic acid, and some rarer substances—and these involve a variety of sampling techniques, some of which have been devised and developed by the team itself.

Every investigation is preceded by a simple job survey. Air sampling has to take into account the period of time during which the operators are actually exposed to suspected hazards: a process which intermittently produces a high concentration of dust or fumes

may be less dangerous than one which continuously produces a low concentration. The pace of the work is important, too, since it affects the amount of air which the operators inhale. In all cases, the samples must reflect normal working conditions, and the results must be interpreted very carefully in the light of on-the-spot observations.

Thus, an investigation depends entirely on teamwork. The health engineer checks the work, the doctors check the workers, and the chemist analyses the samples. And it is only after all this evidence has been considered that the team prepares a written report for the management of the firm in which the investigation has been made.

This is a comprehensive document which describes in detail any dangerous or undesirable factors and suggests practicable methods of improving them. Often it includes diagrams (or even photographs) showing how plant and ancillary installations can be modified to provide safer working conditions.

In many cases the team's recommendations are both simple and relatively inexpensive. Where, for example, men are exposed to dangerous fumes, it may be possible to modify either the materials or the process without affecting the end-product; alternatively, small improvements in the ventilation system may be sufficient to reduce the concentration of fumes in the operators' breathing zones to a safe level.

Some investigations disclose that working conditions are already safe. This information, in itself, is valuable. The men may benefit psychologically from an "outside" assurance that their health is not endangered—and a conscientious management may be saved the expense of adopting unsuit-

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able and unnecessarily elaborate precautions.

Undoubtedly the best way of illustrating the scope and value of the team's work is to give examples. The selection which follows emphasises the fact that many of the problems are "unspectacular" in so much as they concern conditions which are often disregarded or accepted as inevitable; but this increases, rather than decreases, their significance.

Case 1

One firm reported that their clerical staff were dissatisfied with the large, extremely modern offices in which they worked. Some girls complained that the temperature was too high, others complained that it was too low; all agreed that the air was "stuffy." Absenteeism was increasing and the management suspected—with some justification—that the work was suffering.

The health engineer inspected the offices and took measurements of temperature, humidity, air movement, and radiant heat in various positions. A "comfort poll" was also taken: the girls were asked whether the conditions at the time were too hot, too cold or "just right."

These investigations indicated that although the temperature, on the whole, was rather too high for comfort the lack of air movement was the chief cause of the stuffiness.

Fairly simple remedies were described. One was to prevent overheating (and cut fuel costs) by introducing thermostatic control. Another was to invert the top sections of the windows so that, in hopper-form, they would force the incoming air to intermingle with the warm air just below the ceiling. A third was to fit an airbrick behind each radiator. It was also suggested that venetian blinds would be of advantage in hot weather.

As soon as these recommendations were carried out, the complaints ceased.

Case 2.

An urgent call from another firm stated that men and girls employed on a lamination process were being overcome by fumes and that one, in fact, had "passed out." A new type of adhesive, containing trichlorethylene, was being used for the first time.

Sampling disclosed that the amount of trichlorethylene in the general atmosphere exceeded by nearly 200 per cent the safe level prescribed by the American Conference of Govern-

mental Industrial Hygienists. The concentration near the gas-heated roller of the laminating machine was about seven times as great as this.

As a temporary measure, the team advised the firm to discontinue the use of the new adhesive. Later, plans were submitted for a suitable exhaust system, including suggestions for recovering the solvent. These are in the course of being adopted, and further tests will be taken as soon as the work has been completed.

Case 3.

Investigations of suspected hazards sometimes produce unexpected results. An example is the case of a man who was being employed for up to 12 hours a day on casting an alloy containing 95 per cent lead and 5 per cent antimony. Although he had not complained and medical examinations revealed no abnormal conditions, the team felt that the danger of lead-poisoning could not be ruled out.

A number of air samples were taken. When these were analysed, it was found that while the concentration of lead was well below the safe level, the concentration of antimony was far from safe. The remedy was a simple improvement of the existing ventilation system.

Case 4.

An improvement in working conditions may mean an improvement in working methods. In one firm, four men had to sieve asbestos by hand before adding it to a bitumen solution in a tank. Dust counts in the operators' breathing-zones were extremely high, and although the work was intermittent, there was no doubt that the conditions were unsatisfactory.

The asbestos was packed in cloth bags, which allowed the material to aggregate. On the team's recommendation, the firm began to use a different grade, packed in multi-walled paper bags. This eliminated the need for sieving, cut down the time spent on handling the material, and helped to reduce the health risk.

Other improvements included the introduction of a local exhaust system, as it was found that the existing system was able to deal only with the fumes from the tank.

Case 5.

In a department of another factory, also making an asbestos product, the management had already installed an elaborate exhaust system—so elaborate, indeed that it withdrew air

from the building at the rate of 12,500 cu. ft. a minute. As there was no way of heating the incoming air, the operators often complained of cold draughts.

Very little dust was produced by the process, and tests revealed that the air, after passing through bag filters, contained a negligible amount of asbestos. Thus the team was able to recommend that 100 per cent. recirculation of the filtered air should be permitted in cold weather.

Obviously a much cheaper exhaust system would have sufficed in the first place. With this idea in mind, the team encourages firms to seek advice before introducing new processes, since it is generally possible to anticipate the health risks involved and recommend *economical* preventive measures.

Case 6.

Certain components were dipped in benzol and allowed to dry in a brick chamber at one factory. So that the chamber could be filled completely, an operator had to enter it every few minutes and move the components along.

Air measurements confirmed that there was a very dangerous concentration of benzol in the chamber, while blood tests revealed signs of benzol poisoning in the seven men concerned. (One who had a history of anaemia was promptly transferred to another job.) Detailed suggestions by the team allowed the process to be so re-arranged that the operators did not have to enter the chamber at any time.

Case 7.

People living in the vicinity of a chromium-plating factory complained that it was a danger to their health. At the request of the local Medical Officer of Health, the team carried out a full investigation. Air samples taken in both the factory and surrounding buildings were analysed for traces of chromic acid, and as a result of these investigations, the team were able to report that no danger existed.

These brief case-histories illustrate the work of the Slough team in particular and the scope of occupational hygiene techniques in general. With one exception, they represent a small cross-section of the problems which have been investigated in four years in a group of comparatively modern factories already covered by a comprehensive industrial health service. It is not unreasonable to assume that elsewhere—and especially in older factories—a greater amount of work would be found.

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Better Meals with Lower Fuel Costs

Policy Column

Fewer Grumbles

in Sweden

By WINIFRED McCULLOUGH

Senior Canteen Adviser, Industrial Welfare Society

TO compare industrial catering arrangements in Britain with those in other countries is often illuminating. In Sweden, for example, at least one out of two works canteens is run by a committee representing management, employees and trade union officials.

Once the firm have equipped the premises, the committee assume full control. They either engage a manager or make an agreement with a contractor. All committee meetings are held outside working hours, although in some cases members claim travelling and other expenses.

This arrangement works well. Canteen users feel a sense of "ownership" which seems to make them far less inclined to grumble than their British counterparts. The committee discuss such matters as price increases, staff changes and alterations in meal services; generally, their decisions are readily accepted by their fellow-workers.

The most common financial arrangement is for the firm to set up the establishment, look after maintenance and heavy replacements, and provide lighting and fuel. Out of the takings, the canteen tries to pay for food, wages, cleaning materials, laundry and light replacements. If it cannot do this, either the firm agree to make a subsidy or prices are increased.

In many cases, three meals are provided: breakfast (porridge, bread and butter and coffee); lunch at 11.30 a.m.; and dinner at 4.30 p.m., after the works are closed. Prices are at least 25 per cent cheaper than in the cheapest eating-houses.

Kitchens are well-equipped, making far greater use of stainless steel than is customary in British canteens. Dining rooms are light and airy, with tiled floors, big windows, a profusion of potted plants and, very often, original murals.

Kitchen staff are mostly elderly, although some young workers are being trained. They are well paid and are treated in every respect like other female workers in the factory. Spotless overalls are worn—but no head coverings.

Steam cooking improves the flavour and quality of many foods; moreover it is economical in fuel. This article—fourth in a series specially written for executives responsible for equipping and maintaining canteens—describes the main types of steam cooker, their suitability for particular purposes, and the design points which ensure efficient working and long life

STEAM cooking is done at even temperatures, to minimize the shrinkage and drying-up of foods. It is economical in fuel, and makes many dishes more nourishing and more digestible than they would be if cooked by other means.

Generally the food must be protected from actual contact with steam by lidded containers or metal sleeves. Many cooks wrap fish and meat in flavoured cloths or in greaseproof or parchment-type paper before putting them in the steamer. If this is done, care must be taken in unwrapping, as very hot liquor will be present inside the "parcel."

Some cooks place potatoes and other root vegetables directly on the racks of the steamer, sprinkling them with salt and covering them with cloth or paper. This is very successful with waxy new potatoes, hard-crust carrots, parsnips and diced swedes. Even cauliflowers are oven-cooked in this way.

Meat that is to be sliced cold can be cooked economically in the steamer; it retains a reasonably good flavour when carefully wrapped, pre-seasoned and not over-cooked. It cannot compare, however, for appearance or flavour with roasted joints. Ham and salt beef must be well soaked before cooking.

If the steamer is not fully occupied, fruits in syrup can be packed into earthenware jars and covered with paper to take advantage of the spare accommodation. But the sugar and

water syrup must either be made previously or stirred thoroughly once during cooking.

The main use of steamers is for puddings cooked in sleeves, covered basins, individual moulds or flavoured cloths. The door of the steamer should not be opened until the pudding dough has had time to rise and set firmly.

Two main types of steamers are available. The most usual is the "wet" steamer that cooks at atmospheric pressure. A pan of water, brought to boiling point by gas, electricity or steam coils, is incorporated in its body. This is kept at a constant level by a ball-valve outside the steamer and can be emptied by a tap after use. Lining and shelves or racks are usually of tinned copper, but can be obtained in stainless steel if specified. Since the interiors of these steamers are constantly exposed to steam which contains fats and acids, stainless steel is well worth-while.

When the water reaches boiling point, steam escapes from a valve in the roof of the oven and the appliance is ready for use. Throughout cooking, a steady jet of steam should be apparent.

Points to look for in selecting atmospheric steam ovens are:

- 1—Sound, heavy construction.
- 2—Straightflow emptying tap, so that a rod can be introduced to clear the passage.
- 3—Easy access to the feed pipe from



THREE-DECKER: This multi-deck type of wet steamer has a circular water well and hinged compartments which can be filled or emptied independently of each other

Courtesy of Crypto Ltd.

the water tank to the interior of the oven. If this clogs, the steamer will boil dry.

- 4—Safe door opening. The fastening device should be such that the door is "cracked" sufficiently to let steam escape before it can be fully opened.

These ovens can be obtained as single units or in pairs with one feed tank.

Another type of wet steamer, very suitable for smaller canteens or for establishments where meals are served in relays, is the multi-deck type. This has a circular water well, and hinged compartments which swing out and can be filled or emptied without disturbing the contents of the others. A very compact piece of equipment, it needs perhaps more intelligence in use than the single-compartment type, but gives very good service when used wisely.

The "live" or pressure-type steamer is fed from steam raised elsewhere and piped to it. Steam pressure must be reduced to about 5 lb., and the steam is introduced into the oven through perforations in the sides or back. At 5 lb. pressure, the temperature reached is 227 deg. F., against 212 deg. F. in the atmospheric type. This, of course, greatly speeds-up cooking processes.

Foods can be cooked directly in solid trays in this type of steamer, while tough meats, pulses, etc., are readily tenderized. The steam actually comes into contact with the foods; it cannot, therefore, be returned to the boiler but must be drawn off when the boiler is cleared. A safety device is essential to make sure that the door cannot be opened until the steam cock is turned off.

A third type of steamer is the

"pressure type" which generates a pressure of $\frac{1}{2}$ lb. per square inch and maintains it automatically once the current is switched on.

It is thermostatically controlled, has a combined air and relief valve, and is fitted with a pilot light. The door is of the wheel type, and the fittings meet the safety requirements of the insurance companies.

CAPACITY

A single-compartment wet or atmospheric steaming oven is sufficient for a kitchen serving 100/150 main meals. In larger kitchens, where a wide range of equipment of all types is available, the steamer will not be in such universal demand, and one oven for every 200 meals served will suffice. The pressure type cooks faster and therefore has a greater capacity, except where all meals must be ready at the same time.

CARE IN USE

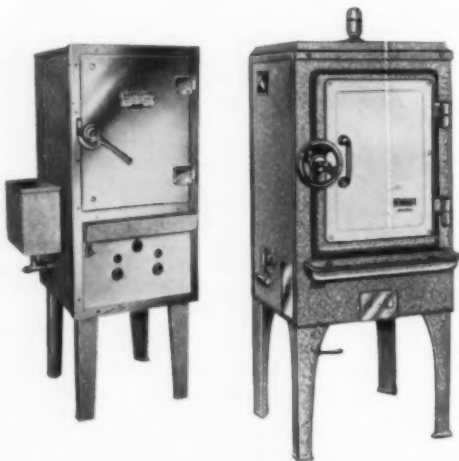
Staff should be carefully trained to respect all safety measures when using steam and to report any need for repair.

The following hints are taken from the report on "Care of catering equipment" by the Hospital Catering

Advisory Service of the King Edward's Hospital Trust.

Live steam jet (pressure-type): These units are normally fitted with automatic valve action to cut off steam when doors are opened. When they are not so provided, adequate instruction should be given to ensure that doors are not opened when steam is still on. The time for heating the interior should be estimated so that undue use of steam may be avoided. Doors should be closed carefully to avoid damage to gaskets. After use, the unit should be cleaned out and wiped dry to avoid corrosion. Cleaning should be by methods prescribed for the materials and components concerned.

Atmospheric or non-pressure type: Do not apply heat unless the water pan is filled to adequate capacity. Heat up the interior by raising steam before cooking commences, but estimate the time this takes in order to prevent undue use of fuel. On no account should the steam vent be blocked or impeded. The door should be closed gently to avoid damage to the gasket and also to prevent sudden inrush of cold air. When the door is opened, heat should be reduced to prevent undue condensation in the kitchen. The unit should be cleaned daily after use, special attention being paid to the water pan, which should be drained and cleaned to remove food particles. Water supply to the automatic feed valve, if provided, should be turned off to allow the contents to be completely drained. If the feed tank is remote from the water pan, care must be taken to ensure that the supply pipe is not blocked by particles.



This "wet" steamer (left) cooks at atmospheric pressure

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Pressure is maintained automatically at $\frac{1}{2}$ lb. per sq. in. in this electric "pressure" steamer

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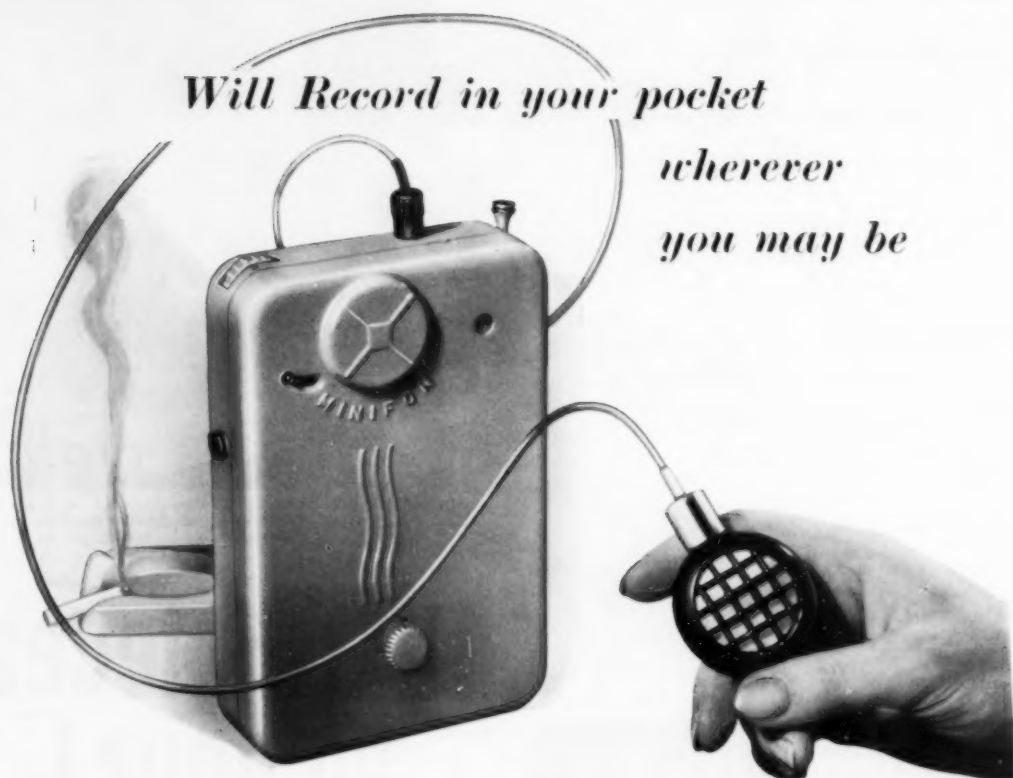
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This new pocket-size wire recorder with the **full-size performance** will record continuously for **up to 2½ hours**. It can be used at home, in the office, the factory, or while travelling, for recording notes, interviews, commentaries and dictation. It is the perfect notebook in sound for oral 'jotting-down' of thoughts, impressions and appointments, etc. Data cannot get lost.

Recorded spools play back with the clarity of the original speech, as often as required, through 'phones, any radio receiver or external amplifier. A foot control for the typist makes transcription easy. Spools can be erased and used over and over again.

Put a Minifon in your pocket, it is always ready for work and will remember everything.

The Minifon can be used in conjunction with the Emidicta Complete Dictation System (See Page 66).

minifon

**POCKET - SIZE
MAGNETIC
RECORDER**

Manufactured by PROTONA, Hanover, Western Germany.

Exclusive Distributors in the United Kingdom for Minifon
E.M.I. SALES & SERVICE LTD., Emidicta Division (Dept. 4), 363-367 Oxford St., London W.1.

Telephone: Mayfair 8597 Grosvenor 7127/8

also Sales Offices: Manchester, Birmingham, Glasgow, Cardiff
EMICA

Minifon Model 54 in green morocco leather carrying case with shoulder strap, complete with batteries and one hour's recording spool; standard (table/lapel) microphone, stethophone with ear-piece in green wallet. Price applies in Great Britain only. **£85**

● Office . . 135 ● Industrial . . 143 ● Welfare . . 151

FOR YOUR OFFICE

Pocket-size Recorder

DESCRIBED by its manufacturers as a "pocket-size precision magnetic recorder," the *Minifon* Model 54 will give up to 2½ hours continuous recording. It is particularly useful for the recording of notes, conversations, facts, figures, etc. and is small enough to be placed in a coat pocket.

The microphone can be held in the hand or attached to the lapel, and the spools can be stored, played back or erased for further use. Play-back is effected through a telephone, a radio receiver or some other external amplifier. For transcription on to the typewriter there is an auxiliary foot control.

The instrument is supplied in a leather case, with a zip-fastener and shoulder strap; a crystal lapel micro-



One gangway only

This is effected by means of electrically-operated handles which, when pulled, automatically open the shelving at the appropriate place. Apart from the large saving in space which the shelving makes possible, it helps to prevent accumulation of dirt and dust. In addition, the whole installation can be locked, thus making unauthorized access to private documents impossible.

Enquiry Ref. No. O.11/2.

New Label Sticker

DESIGNED especially for firms whose labelling requirements do not justify a heavy outlay on plant, the *Lightning* electric labeller can be



Capacity, 1000 labels

phone, head phones and spools for 1 hour are also included. Extra spools with recording times of ¼, ½, 1, 2 or 2½ hours can be supplied on demand, and other optional accessories include an A.C. mains transformer, a microphone for attachment to the wrist, and a telephone attachment for recording both sides of a conversation.

Enquiry Ref. No. O.11/1.

New Storage System

CLAIMED by its manufacturers to be an entirely new system of office storage, *Compactus* shelving requires only one gangway per block of shelves.

quickly and easily converted to deal with labels of varying sizes. Over a thousand labels, up to 3¼ in. wide and not less than 1¼ in. long, can be accommodated at one time, and the speed of delivery can be varied to suit individual requirements.

Operation of the machine is controlled by a foot pedal, thus leaving the operator both hands free.

Enquiry Ref. No. O.11/3.

Improved Overprinter

THE new *Tickpres Imprima* Model TV overprinting and marking machine incorporates a number of noteworthy improvements. An extended feed-tray giving greater facility for easy feeding of labels is fitted, and features quick action, automatic locking ticket guides. The type-drum is interchangeable, thereby avoiding the need for re-setting of type matter which is in constant use. The drum is also fitted with an extra-large elongated slot, so



Many new features

that there is now a wider range of adjustment for all types of tickets. A locked mechanism ensures that the inking roller is completely foolproof, and a new type of cover gives the machine a more streamlined appearance and protects the roller spindle ends from dust and dirt.

Other features include a new type of setting control for different thicknesses of paper, cards, etc. and an automatic

★ Equipment included in this survey is selected for its news value alone. The names and addresses of the manufacturers or distributors of items mentioned can be obtained by writing to the Editor, quoting the appropriate reference number. Manufacturers are invited to submit details of new and interesting products for consideration. An original photograph should accompany each item submitted.

Business EQUIPMENT SURVEY

stripper which eliminates the risk of labels getting caught up in the rollers should the ink be too wet.

Enquiry Ref. No. O.11/4.

Dual-Purpose Recorder

EQUALLY suitable for use in the office or for travelling, the *Stenocard* dictating and transcribing machine weighs only 7½lb., with overall dimensions of 11½in. x 8½in. x 3½in. The machine uses the principle of magnetic sound recording, the actual recording medium being an erasable belt which can be used over and over



For office or journeys

again. The belt will record approximately 12 minutes dictation, which can be transcribed immediately, mailed, or filed for use at some other time.

Among the most important accessories of the machine are single or twin earphones, a microphone for recording and play-back, and a bag for containing the complete unit.

For easy portability, the case is also fitted with a strap.

Enquiry Ref. No. O.11/5.

New Postal Franker

THE *Frankmaster* postal franking machine, which has recently become available, will take all kinds of envelopes and can be used for labels without needing any additional attachments. The machine can also be adjusted to print revenue stamps if the size and range of values come within the limits of the model being used. If necessary, cancellation markings can be dispensed with.

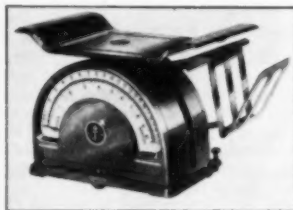
There are several models available, the complete range covering the full requirements of Inland letters, parcels and telegrams, and also Overseas and Airmail letters and parcels. The FM 150 franks ½d. to 1/11½d., the FM 165

franks ½d. to 9/11½d., the FM 180 franks ½d. to 29/11½d., and the FM 195 franks ½d. to 99/11½d.

Enquiry Ref. No. O.11/6.

Pendulum Letter Balance

AN unusual feature of the new *Anchor* letter and parcel balance is the fact that it is operated by means of a springless counterpoise pendulum



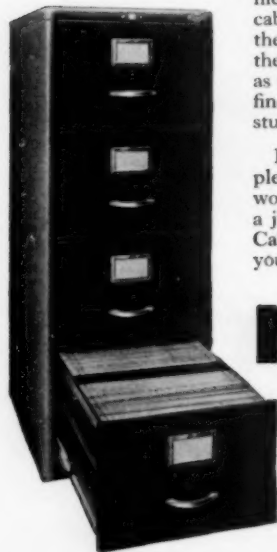
Accuracy ensured

balance, in contrast to the ordinary type of spring balance. To eliminate loss of accuracy, due to off-centre loading, the balance mechanism has parallel control, and the machine is also fitted with a zero adjustment

Do you torture your staff?

It's VERY EASY. Just let bulging correspondence files overflow into odd drawers and ancient cabinets. Watch this process complacently—and then pounce! Ask for an obscure letter and watch them scurry as you scowl. Enjoy the mass panic as the clock ticks on towards 5.30. They'll never find it. A few bouts of this treatment knocks the stuffing out of the best-trained staff.

If, on the other hand, you are one of those pleasant people who like offices to run like clockwork and a contented staff who can find a letter in a jiffy, then we can only say that Milners Filing Cabinets and the Mil-Span filing system are what you need. But be warned. You'll never be able to torture your staff again!



Milners

THE FINEST STEEL EQUIPMENT YOU CAN BUY

MIL-SPAN

The Mil-Span Suspended Pocket Filing system is simple and efficient. Files never get out of order because each has its own pocket. There is nowhere for loose papers to get lost.

For further details, phone, write or call:
MILNERS SAFE CO. LTD., 58 HOLBORN VIADUCT,
LONDON, E.C.1

Telephone: CENTral 0041/5



MADE TO MEASURE
for **CODING**
IDENTIFYING
CLASSIFYING

Illustrated are impressions of characters and figures of special numbering machines. They meet the many diverse problems of coding, classification and identification and are widely used in the Ball Bearing Industry and for the overprinting of labels, shirt and collar size marking, Jacquard card sequences, the printing of optical formulae, and for multi-impressions through carbon backed forms.

ENM can solve your problems by supplying high grade machines made to meet your special needs



ENGLISH NUMBERING MACHINES LIMITED

(Dept. 3b), Queensway, Enfield, Middlesex. Tel.: Howard 2611/5 Grams: Numgravco, Enfield



FRANKOPOST

SAVES TIME AND MONEY
IN THE OFFICE
— AND OFFERS YOU

FRANKOPOST postal frankers that eliminate the time wasted in buying, sticking-on and accounting for ordinary adhesive postage stamps, can be used by any mailer with a post of 10/20 letters per day upwards.

TOTOMETER a new counting and imprinting machine which operates at speeds up to 55,000 pieces per hour with 100% accuracy.

ALSO AVAILABLE FOR THE FIRST TIME the new **FOLDOPOST** letter folding machine which is a small electric desk model with automatic feed that operates at speeds of up to 5,000 per hour **AND** the **DIRECTOR** cheque signing machine hand or electrically operated, which gives absolute security with simplicity of operation.

For full details without obligation:—Write or telephone

UNIVERSAL POSTAL FRANKERS LTD.

90 REGENT ST., LONDON W.1.

REGENT 2249

NOVEMBER, 1954

137

Business EQUIPMENT SURVEY

screw. A red-tipped pointer gives greater clarity to the dial.

The balance will weigh letters up to 10½oz. and parcels up to 22lb.

Enquiry Ref. No. O.11/7.

Carbons Dispenser

THE *Carbouche* and *Carbette* are claimed to form the perfect combination for efficient storage and dispensing of carbon papers.

The *Carbouche* is a leatherbound folder, designed to hold a pad—or *Carbette*—of approximately 200 sheets of carbon paper. Each of these pads is mounted on a baseboard which is



For preserving carbons

attached to the inside of the folder, thus keeping the pad firmly in position. In addition, the sheets of carbon paper are fastened together at the head of the pad and can be detached singly. This prevents damage or any likelihood of the papers scattering if a window is opened.

Refills can be obtained as required.

Enquiry Ref. No. O.11/8.

Twin-Roller Damper

THE new *Velos 1509* twin-roller damper should be useful in all offices where stamps, etc. have to be dampened before sticking down. A rubber-covered top roller picks up an even film of water from a lower roller, thus making the frequent "topping-up" required with most dampers unnecessary.

The model is fitted with rubber feet to prevent noise and skids, and the all-steel body is cadmium plated and finished in durable glossy enamel.

Enquiry Ref. No. O.11/9.

Lightweight Portable

CLAIMED by its makers to be equally suitable for use in offices or for travelling purposes, a new portable



10 clear copies

typewriter produces exceptionally clear lettering and will give up to 10 legible carbons. Other noteworthy features are the large-diameter platen and the one-piece ribbon cover, which can be removed easily when the ribbon needs changing.

A waterproof leather carrying-case, with pockets fitted on the interior lining



← This was *ONCE* a business problem!

Holding on for connections, repeating conversations—tied to a telephone. All these meant loss of time, money and efficiency **EVERY** time you used a **TELEPHONE**

No repetition of conversations when two or more people are together



Leaves you free to refer to files whilst the receiver is still on the **FONADEK**



Doubles her efficiency - leaves both hands free for switchboard operation

A **Fonadek** by the 'phone guarantees increased efficiency, eliminating up to two hours wasted time each day. The Receiver (G.P.O. or internal Telephone) is placed on the **Fonadek**, it is then possible to speak and hear freely whilst carrying on normal work.

Everyone in your business from Executive to Telephone Operator needs a **Fonadek**.



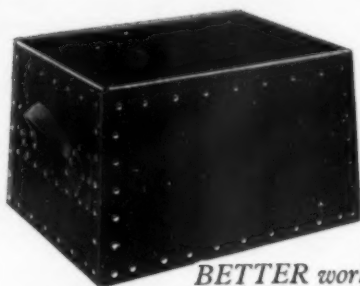
... now solve yours with a **FONADEK** system

Just write **Fonadek** on your letterhead for our brochure.

FONADEK (BRANSON) LTD. Dept. B, Vivian Road, Birmingham 17. 'Phone: HARborne 2267/8
Branches and Agents throughout the British Isles

Fibre Board BINS, TRAYS and Boxes mean lighter

work
for
your
staff



*That means
BETTER work for YOU!*

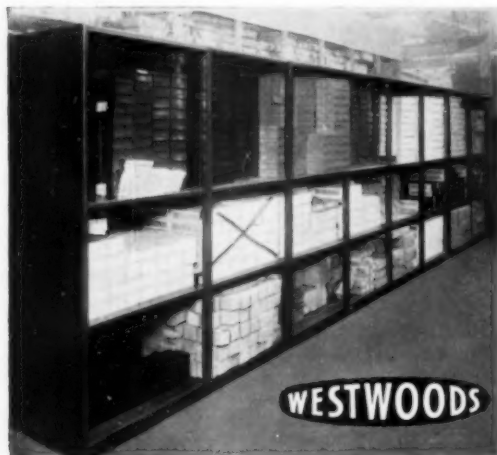


Yes, they'll work better without the fatigue of carrying or stacking heavy boxes. Fibre Board is the answer! Light, yet strong, ENFIELD Boxes, Bins and Trays are especially appreciated by female workers—an appreciation they will show in increased productivity.



Queensway, Enfield, Middlesex

Phone: Howard 1888 (2 lines)



INDUSTRIAL STEEL SHELVING

Storage Bins, Clothing Lockers, Cupboards
Makers of Steel Storage Equipment for 25 years

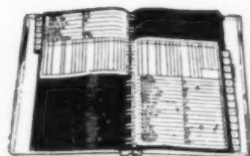
JOSEPH WESTWOOD & CO., LTD.

Napier Yard, West Ferry Road, Millwall, E.14.

Phone: EASt 1043 (4 lines)

NOVEMBER, 1954

NEW! *this flexible, compact*



VEHICLE CONTROL PLAN

saves

TIME, EFFORT, PERSONNEL, MONEY

EVERY DETAIL concerning your vehicles is instantly available on a sheet measuring but a few square inches . . . and, what's more, a system of coloured signals thrusts important information to your notice, such as when urgent attention is needed, or the date for the next routine servicing or any change in fuel or tyre consumption and so on.

RECORDS AT A GLANCE

The record's visible edge identifies each vehicle at a glance; a finger-flick and full information about it is immediately visible. Year of make. Date of purchase. H.P. engine and chassis No. Unladen weight. Cost. Value. Capacity. Type of fuel. Oil and fuel consumption. Tyre mileage and all other necessary details. Month by month servicing is provided for, including actual details of work done, under headings which provide for almost anything.

SIMPLE—COMPACT—EASY-TO-USE

This amazingly efficient vehicle record system is housed in strong and very compact binders, or in small, portable panel form. Either way, a large number of vehicle records can be contained in a negligible space. Any record can be inserted or removed in a second, retaining correct order.

MAINTENANCE CANNOT BE MISSED
RISING FUEL, OIL and TYRE CONSUMPTION
CAN BE CHECKED BEFORE THEY
COST YOU MONEY
REPAIRS CAN BE DONE WHEN IT SUITS YOU
—NOT WHEN YOU MUST

And remember, this system has been devised with the advice of some of the largest operators in Britain. Many others tell us that the ability to keep a correct maintenance schedule saves far more than the modest cost of the system, and in addition they enjoy the advantages of the most rapid, simple and comprehensive method of keeping vehicle records.

Just jot "Vehicle Record" on your letterhead for full details by return. There is also a special Stock Record for spares. If interested, please ask for "Stock Record" as well.



VISIBLY BETTER RECORDS

The Shannon Ltd., 99 Shannon Corner, New Malden, Surrey

Business EQUIPMENT SURVEY

for stationery and correspondence, is also provided. The machine casing is in green, with chromium plating on all bright parts. Total weight, 10lb.

Enquiry Ref. No. O.11/10.

Loose-Leaf Phone Index

CLAIMED to be the first and only loose-leaf telephone index available, the *Compex* differs from the ordinary type of guide in that the pages can be quickly inserted or removed, thereby permitting indefinite expansion of any section. The letter guides printed at the base of each sheet are fitted with plastic protectors, and these can be taken off, so that the sheets can be inserted into a typewriter and the various names and numbers typed on. At the rear of the index is a loose-leaf calendar which can be replaced at the end of each year.

Both desk and wall models of the index are available.

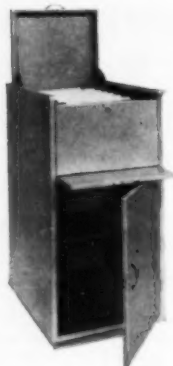
Enquiry Ref. No. O.11/11.

Executive Filing Cabinet

DESIGNED for use in an executive's own office, a new personal filing cabinet incorporates a large filing

compartment as well as a roomy cupboard and "slide-in" shelf. The top can be pulled back, giving easy access to the filing compartment, which takes approximately 50 foolscap suspended type files.

Dimensions are 19in. x 26in. x 24in., and the finish is in silver grey, pale



Easy-access filing

bronze or green. The cabinet is optionally fitted with four silent castors for easy movement.

Enquiry Ref. No. O.11/12.

Drawer Partitioning

COMPARTEX is the name given to a new system for providing adjustable compartments in drawers, trays, stores fixtures, light shelves, etc. A patented clip and specially treated strips which are made to fit the clips enable anyone to set up compartments in a few seconds. The compartments can also be altered to different sizes or, if necessary, removed altogether.

The system should be particularly useful for keeping various sizes of stationery and other office accessories separated, or in firms where stocks are constantly fluctuating.

Enquiry Ref. No. O.11/13.

On page 131 of the "Business" Directory of Office Equipment and Appliances, the Cambridge branch of Ronco Ltd. is wrongly listed under Cheshire. Will readers please amend their copies accordingly.

COUNTING INSTRUMENTS

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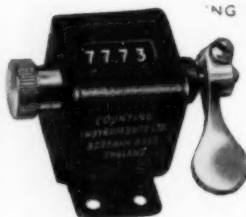
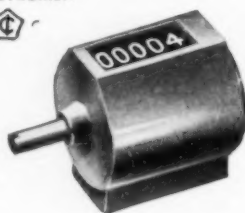
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A wide range of small non-reset counters and stroke counters with reset is available. Write for leaflets Nos. 2 and 3. Also mechanical and electro-magnetic counters for all purposes.



COUNTING INSTRUMENTS LTD.

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Telephone: ELSTREE 1382.3-4. Cables: COUNTHOR, BOREHAM WOOD



to
indicate,
record or
control
temperature



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BI-METAL · MERCURY-IN-STEEL · VAPOUR PRESSURE

THE BRITISH ROTOTHERM CO. LTD.
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INTERCHANGEABLE NOTICE BOARDS

slotted wood backboard, plastic characters, easy-fix, made to any size, exact alignment, clean, neat, unique and attractive.

PROTECTIVE GLAZING FILM

heat sealing, protects face of showcards, economical, quickly applied, transparent, washable.

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in colours, imitation gold and silver, for use on all hot stamping machines for marking card, paper, wood, plastics, etc.

ENGRAVED DIES OR TYPES (Bronze or Steel)

made to your own requirements for stamping machines.

METAL STRUTS—TICKET PINS—HANGING RINGS

for affixing to card or plastics, hang or stand your displays in any desired position.

FLUORESCENT DISPLAY PAPER

in gummed for cutter-crush or ungummed or posters, etc.

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hand bench models for card or papers, etc., 9" to 24" blade.

WATER SLIDE-OFF TRANSFER FILM

for your use in either reels or sheets.

ACETATES—DISPLAY BOARDS—GUMMED PAPERS

large selections always available from our works.

BEVELLERS—FOIL CUTTERS—TYPE CABINETS

FINISHING PRESSES—DOUBLE GUMMED MANILLA

WE HOLD LARGE STOCKS OF

MASSELEY STAMPING MACHINES

AT EXTREMELY LOW PRICES—FULLY GUARANTEED AND REBUILT BY

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ACTON WORKS, BEACONSFIELD ROAD

ACTON GREEN, LONDON, W.4

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By Appointment
Wine Merchants



to the table
King George VI

TO PROMOTE GOODWILL between friends

What could be more effective and agreeable than a case of Harvey's Wines from the celebrated "Bristol Milk" cellars? Here are just two suggestions, guided by the wine wisdom of 150 years. Many other equally acceptable Cases are offered in our Gift List, and we should be glad to send you a copy of it, together with an illustrated price brochure.

THE SPORTSMAN'S CASE 88/-

- 1 bottle Select Shooting Sherry, full golden
- 1 bottle Hunting Port, fine old tawny.
- 1 bottle Harvey's Golf Blend Scotch Whisky.
"The 19th Hole" (25 u.p.)

THE CASE FOR CHRISTMAS DAY 106/-

- 1 bottle Merienda Sherry, pale medium dry.
- 1 bottle The Abbot Port, very light tawny, dry.
- 1 bottle Medoc Claret.
- 1 bottle Graves Supérieur.
- 1 bottle Harvey's Pirrot Champagne.
- 1 bottle Harvey's Hedgepick Sloe Gin.

The charge includes carriage and packing, and any case will be delivered to any address in Great Britain in time for Christmas, if the order is received by December 14th.



"Bright to the Last Drop"

JOHN HARVEY

& SONS LTD (Founded 1796)

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Tratfalgur 4436



Designer's dream comes true!

POLYESTER RESINS for all industry — soon

One of the most promising industrial developments of recent years is the arrival of *polyester resin laminates* as constructional materials.

Already widely used in the U.S.A., these plastic products are soon to be more readily available in this country, because of Monsanto's increased production of the essential raw materials. These include **MALEIC ANHYDRIDE** (made in this country only by Monsanto); **PHTHALIC ANHYDRIDE**, and **STYRENE MONOMER** (made by Forth Chemicals Ltd., an associate of Monsanto).

Polyester resin laminates offer these big advantages:

- *High impact strength, ability to withstand vibration, etc.*
- *Light weight (U.S. sports-car body, 9 ft. x 6 ft., weighs 75 lbs.)*
- *Easy to fabricate with unskilled labour.*
- *Flexibility and ability to adapt to design, not vice versa.*
- *Easy to clean, easy to repair (new resin is simply "moulded in").*
- *No corrosion or deterioration.*
- *Chemical resistance.*
- *Can be drilled, milled, turned, etc., and metal inserts applied, as necessary.*
- *Less painting — dyes can be incorporated during process.*
- *No large capital investment in machinery.*

Polyester resin laminates can be produced in sheet form, or in moulds of any shape or in continuous piping (withstanding great pressure and permitting fittings), rods, tubes, etc. Monsanto, who make only the raw materials for this versatile product, will be pleased to give you all up-to-date information and details of dependable suppliers and moulders.

Write to the address below today!

MONSANTO CHEMICALS FOR EVERY INDUSTRY

MONSANTO CHEMICALS LIMITED,

23 Victoria Station House, Victoria Street, London, S.W.1.

and at Royal Exchange, Manchester, 2.



Regd.

INDUSTRIAL EQUIPMENT

MACHINE TOOLS

Versatile Machine

BUILT from heavy gauge steel plate, a new swaging, wiring and jenny machine, the *Besco Model E.14*, can handle flat sheets, discs, cylinders and drums up to 14 S.W.G. mild steel of 28-ton tensile strength. Twelve pairs of rollers are supplied for swaging, ogee beading, wiring and tucking, jennying, joggling and necking and special rollers can be supplied as extras for flanging, crimping and beading, bottom closing and paning-down operations.

Movement in either direction is effected by a remote-control foot unit, a guard plate preventing both pedals



For swaging,
wiring and
jennying

being pressed simultaneously. The top shaft is spring-balanced and controlled by a capstan screw. The lower spindle has horizontal adjustment and is locked by two hand levers which control the alignment of the rollers with each other. The speed of the rollers is 15 r.p.m. (15ft. per minute) and they are driven by a 1½-h.p. motor through worms and wormwheels. All spindles run in phosphor-bronze bearings. Working height from the floor is 41½in., with 17in. by 38½in. floor space.

Enquiry Ref. No. F.11/1.

PORTABLE POWER TOOLS

Constant Visibility

CLAIMED to be capable of cutting wood, paxatex, cardboard, synthetic materials, eternit, brass and bronze, the *Buser* hand saw is electrically driven from A.C. or D.C. mains, 110-250 volt, 50 cycles. It will saw thicknesses up to 5 cm. An exhaustor

removes the sawing dust, thus giving constant visibility of the workpiece. There are six interchangeable blades—three for wood in fine, medium and coarse pitch, one for plastics and two for metal cutting. A screwdriver, two saw blades and a tube of grease are supplied with each saw.

Enquiry Ref. No. F.11/2.

MATERIALS HANDLING

New Shop Crane

THE *Staffa 2* portable hydraulically-operated shop crane has many uses in workshops or garages where a simple, robust and easily-transportable lifting appliance is in regular demand. The pivoting jib and its supporting column are made from folded and welded steel plate and mounted on a fabricated steel base frame with two tubular legs, in which are fitted two 7in.-diameter travelling wheels.

At the rear of the base frame are a set of 7in.-diameter wheels, mounted on needle roller bearings and located in a rotating assembly which can be steered by means of the towing handle. Depression of the towing handle raises the rear of the crane from the floor so that it becomes fully mobile on the wheels, while raising the handle allows the rear of the base frame to rest firmly on the feet provided. Lifting of the load is effected by a ram which pivots the jib, and is powered by a hand-operated pump, fed from a tank formed in the bottom of the crane column. A chain and hook attached to the outer end of the jib are adjustable to give wider variation in clear lift.

The hydraulic unit employs a two-stage hand pump. A manual change-over operated from the handle of the pump permits selection of two alternative rates of delivery and maximum



Easily transportable

working pressures to suit various conditions. The load is lowered by means of a needle-type control valve which allows the oil from the ram to return to the oil reservoir. The ram has a stroke of 24in. and a bore of 2½in., developing a maximum thrust of 10 tons at 5,000 p.s.i. Measurements are: Overall width over legs—5ft. 6½in. Overall height—10ft. 3in. Length (with towing handle lowered)—10ft. 6in. Total lift of hook—6ft. Maximum lifting capacity—5,000lb.

Enquiry Ref. No. F.11/3.

Lorry Loader

THE *Quick Lift* is an hydraulically-operated device for loading and unloading vehicles. It is generally accepted that mechanical aid is needed for this operation and that it necessitates mechanical handling equipment at both ends of the journey. With this



Locks the load

unit, however, the equipment is carried under the tailboard of the lorry.

The hydraulic ram which actuates the lift is fed from a pump driven from the power take-off, now a standard fitment on all trucks. In use, the vehicle motor is left running at just over "tick-over" speed and the movement of the lift itself is controlled by a finger-tip manual lever at the side rear of the truck body, accessible to an operator on the ground or in the truck. Safety devices cover all movements and meet incidents such as overloading and engine failure.

One of the features of this unit is the working of the fork arms, which automatically rise through a predetermined angle to lock the load before the platform commences its upward movement. The unit is designed to handle any shape of load and is normally set for 15cwt. maximum.

Enquiry Ref. No. F.11/4.

MAINTENANCE

Electric Grinder

DESIGNED for use in the machine shop, toolroom, workshop or garage for the maintenance of twist

Business EQUIPMENT SURVEY

drills, tools or general light grinding duty, is a new single or three-phase electrical grinder. It is totally enclosed and the speed on load is 2,850 r.p.m. The wheels measure 6in. by 4in. by 1/2in., or 7in. by 1in. by 1/2in., one coarse and one fine grain wheel being supplied with each machine. The motor for the 6in. grinder is 0.33 h.p. single-phase, or 0.5 h.p. three-phase; that for the 7in. grinder is 0.5 h.p. single-phase or 0.75 h.p. three-phase.

The motor is mounted on a cast iron

base to which is fitted an "on" and "off" switch. Each model is fitted with a double-ended steel shaft with wheel guards, adjustable tool rests and spark arresters. All bearings are dust-proof. A pedestal model, with the same specifications, is mounted on a cast iron pedestal complete with built-in water cavity and two tool shelves. Voltages are 200-220, 220-240 or 230-250 single-phase A.C. and 400-440 three-phase A.C.

Enquiry Ref. No. F.11/5.



Bench or pedestal type

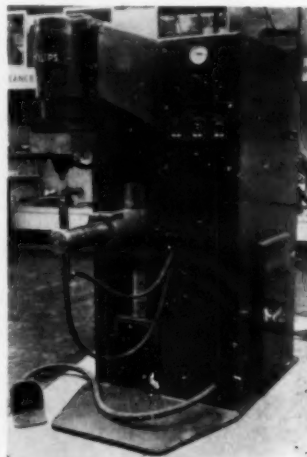
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Business EQUIPMENT SURVEY

initiation takes place only at the correct pressure.

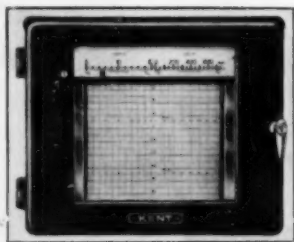
Welding pressure is indicated by a gauge marked in pounds, calibrated against the sizes of air cylinder employed. The lower arm of the machine is adjustable, both horizontally and vertically, and provision is made for either vertical or offset stakes. Electrodes are all B.S.S. 807 standards. The machine is available in three throat depths, 18in., 24in. and 30 in., and can also be fitted with a high-lift head, to facilitate welding of components which have deep flanges to be overcome, whilst employing only a short welding stroke.

Enquiry Ref. No. F.11/6.

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LAATEST in the range of *Multelex* instruments is a combined oxygen and temperature recorder. It is the counterpart of the combined carbon dioxide and temperature recorder, but a magnetic oxygen analyser replaces the carbon dioxide analysis cabinet. It is designed primarily for use in the boiler house, where its side-by-side record of flue-gas temperature and analysis provides the engineer with an



Accurate record

easily-read picture of stack losses. The oxygen analyser measures the oxygen concentration in the flue-gases, which bears a close relation to the quantity of excess air, and thus gives an accurate record of combustion conditions.

The recorder is of the two-point form, the change-over from one point to the other being automatic. The oxygen record is on the left-hand side of the chart and the temperature record on the right. The two measuring circuits are entirely separate. The range of oxygen in flue gas that can be accommodated is 0-15 per cent. The temperature circuit is of the three-wire resistance-thermometer type with a standard range of 0-750 deg. F.

Instrument sensitivity with a galvanometer system is obtained by the use of a vibrating-reed synchronous converter.

Enquiry Ref. No. F.11/7.

HAND TOOLS

Key Spanner

THE *Practica* adjustable key spanner, claimed to reduce the necessity for expensive special-purpose jigs, is used for removing or securing internal cells, internal or external locking rings, bushes, collets, thrust collars and many other components. The spanner is easily adjustable for different diameters



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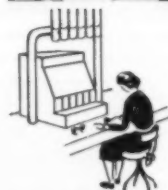
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and depths and is capable of gripping up to a 3-in. diameter. Three sets of keys are provided with each spanner.

Enquiry Ref. No. F.11/8.

New Spanner

A NEW multi-purpose spanner, the *Leytool 10-way*, is made from a high tensile steel forging and designed to fit 10 different sizes of nuts. The plated hand grips, which slide in slots



Protection for hands

machined in the spanner face, provide protection to the hands and permit maximum effort to be applied. They can be used one at each end or both at either end. The tool is made in three standards, and finished in different colours for identification—red for Whitworth and B.S.F., black for S.A.E. and blue for metric. Sizes are —B.S.F. $\frac{1}{4}$ in. to $\frac{3}{4}$ in., Whitworth $\frac{1}{8}$ in.

to $\frac{3}{4}$ in., S.A.E. $\frac{1}{8}$ in. to $\frac{3}{4}$ in. and metric 5 to 20 mm.

Enquiry Ref. No. F.11/9.

GENERAL

Factory Entrance Barrier

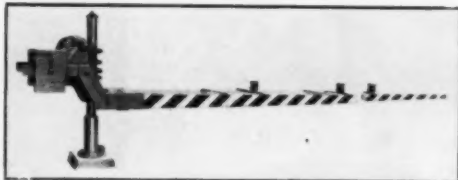
A NEW, electrically-operated barrier is specially suited to the control of road traffic at factory and depot entrances. It is designed to be carried on a $5\frac{1}{2}$ -in. diameter post to which the operating mechanism, powered by an electric motor, is attached. The motor drives the barrier arm from the horizontal to the vertical position where it is held by an electrically-operated brake. In the vertical position, the arm is completely clear of all road traffic. The arm is counterbalanced but biased to return to the horizontal position when the brake is released; during descent, its speed is governed

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DUST from pedestal grinders has long been recognized as a serious threat to the health of operatives. By removing the dust, the *Dusgard* dust exhausting equipment alleviates this danger. The equipment is a one-piece unit comprising a mild steel faceplate with three slots, all connected to an exhaust manifold at the back of the plate, from which two side screens



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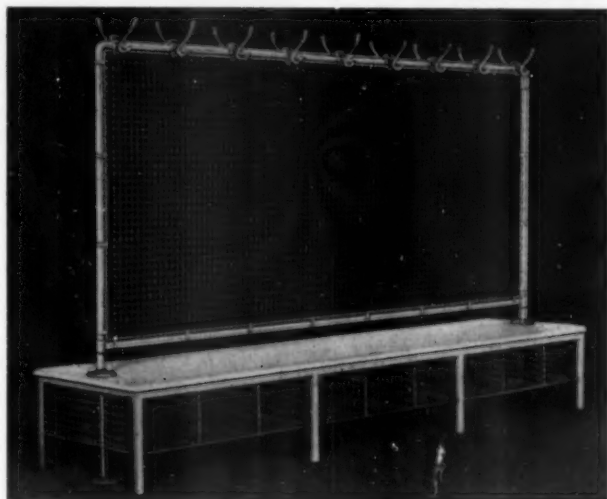


Fig. No. 2616: Also available single-sided for wall positions or base unit alone can be supplied together with hat and coat hooks for wall fixing. For complete range, please ask for List No. BU 879

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Business EQUIPMENT SURVEY

extend back to the sides of the standard wheel guard.

A circular spigot is provided for connection to the exhaust system and it is claimed that the unit is easily fitted without any major alteration to



Alleviates the danger

the grinder. In action, the horizontal slot across the top of the wheel and the two side slots generate curtains of air for facial protection, while suction beneath the grinder assists the down-flow of heavy particles.

When a complete new system is to be installed, both the unit and bottom hood are connected to a common duct system. Where the existing hood exhaust is adequate, the unit may be connected to a separate duct system exhausted by a centrifugal fan. It is made in standard sizes to suit most wheel sizes and makes of stand grinder. Closing strips must be fitted where narrower-than-standard wheels are employed.

Enquiry Ref. No. F.11/11.

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THE waste of time caused by stop-pages for regrinding steel cutters is minimized by the Karbo tungsten carbide engraving cutter. This tool, it is claimed, will engrave 50–100 times more components before regrind-



Time saved

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Enquiry Ref. No. F.11/12.

BUSINESS

WELFARE EQUIPMENT

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A FEATURE of this new industrial chair which makes it especially suitable for female employees is the large locker fitted beneath the hinged



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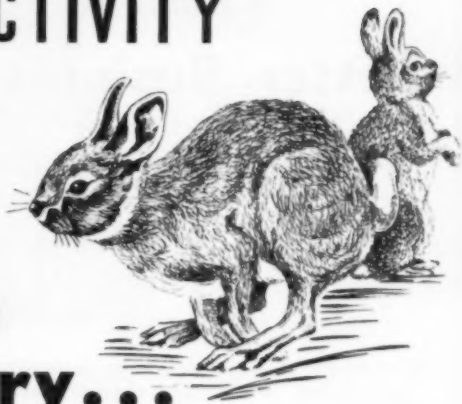
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ELECTRONICS

Continued from page 78

punched-card installation will be capable of supervising a computer installation on the same scale, and that transcribing business "programmes" into machine instructions will be undertaken satisfactorily by non-technical clerical workers after only four to six weeks' training.

The programming of business procedures falls into two stages. The first and more difficult is deciding exactly what has to be written into the programme. This is nothing more (and certainly nothing less) than standard O and M practice—the work has to be analysed in detail before the methods expert can determine the best way of doing it.

Once the contents are fixed, translation into machine "language" is relatively simple. Naturally it demands specialized knowledge—but there are no grounds for suggesting that clerks of the future will have to be trained in higher mathematics.

Another simplifying factor is that standard business procedures seldom change. Programmes, on either pun-

CANTEEN EQUIPMENT
is unavoidably held over until
the following issue

ched cards or tape, will be held on file and repeated time and again; in addition, a library of standard "sub-routines" will facilitate the production of special programmes.

Drawing up programmes for mechanical and engineering applications is, of course, another matter—but the probability is that the firm which turns its "business" computer to occasional uses of this kind will have staff with mathematical qualifications, who will need only a relatively short period of training in programming itself.

As more versatile machines become available, the manufacturers themselves will arrange training courses for their customers' staffs, and provide comprehensive technical and advisory services. Some, indeed, will supply "standard" programmes for payroll and similar common procedures.

Reliability—and Accuracy

Reports indicate that the reliability of electronic business machines is good. A certain amount of "down time" is inevitable, especially with the more

BUSINESS

complicated types; American experience puts this figure in the region of 5 to 15 per cent. But improvements will be made as operating and manufacturing experience is gained, and certainly there seems no justification for suggesting that computer users will either have to duplicate their installations or risk critical hold-ups.

The manufacturers, well aware that spares and servicing facilities will largely determine the customer's choice, are tackling such problems from the design stage onwards. All the new commercial machines are being constructed on the "packaged" principle, and on-site maintenance work will be reduced virtually to the replacement of standard plug-in units. Facilities will be available for carrying out fault-detecting routine before the work starts (varying the H.T. voltages, for example) while running a test programme through the machine will help to locate defective components.

What happens if a computer goes wrong? External warning of a major fault is usually given by the erratic behaviour of the output mechanism (or even by the wild improbability of some of the results!). More subtle forms of misbehaviour are certainly possible, but there are various means of offsetting them: for example, by writing mathematical checks into the programme, or by using machines which automatically check their own operations.

U.S.A.: pattern for Britain?

Most European countries are now producing electronic calculating machines; France particularly has made considerable progress. But none has matched the pace of American activity and it is this—allowing for obvious disparities in operating conditions—which many people will regard as the pattern of future developments in Britain. What stage has the American electronic "evolution" reached?

On a high level there are some impressive achievements like the commercial installations of *Univac* and *IBM's* giant data-processing machines. And here, indeed, the pace is increasing. After taking more than two years to make the first six *Univacs* all of which were acquired by U.S. government departments—Remington Rand are now turning out four a month. They also make an equally large computer, *ERA 1103*, for scientific and engineering applications.

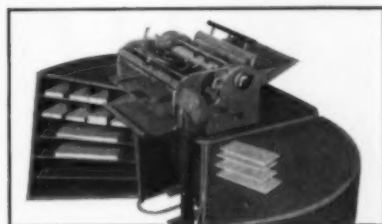
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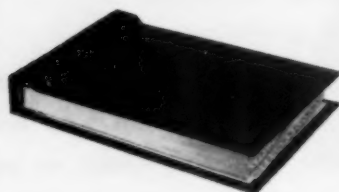
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IBM are producing and installing commercially an even more versatile version of the 701—the 702.

On a lower level there is plenty of activity, too. A conservative estimate is that at least 4,000 electronic machines—mainly calculating punched and, to a lesser extent, card-programmed calculators—are already being used commercially.

Considerably less progress has been made in the development of small and medium-sized commercial computers. There is reason to believe that the new British machines will equal or surpass any comparable equipment which is generally available at present in the U.S.A.

Certainly there are no signs that an age of push-button offices is imminent. Although American businessmen talk enthusiastically about the prospects of "automation" and the "complete integration" of office procedures, both they and the manufacturers are more directly interested in machines which make immediate improvements at some stage of the clerical production line.

The potentialities of special-purpose machines are being developed. An example is the Speed Tally—an electronic "memory" unit with keyboard inputs and an output printer. John Plain and Co., a Chicago mail-order company, are using it to record the orders received for each of approximately 12,000 catalogue items (see page 37 of the March 1954 issue of BUSINESS). Similar machines have been installed by warehousing firms, departmental stores and factories.

Who is using the calculating punches and card-programmed calculators? Generally they are restricted to large organizations—railroads, airlines, insurance offices, oil companies, etc.—which have installed them either singly or in batteries, on a departmental basis. Purchase and rental costs are still high, and it is not expected that these will be reduced by real mass-production methods for at least two years.

Nevertheless, some relatively inexpensive machines are becoming available. The Burroughs Corporation, for example, have just introduced a desk-size machine (32,500 dollars) which incorporates a standard keyboard input unit, a fast semi-ganged output printer and a simple pinboard programming system. Pre-punched card templates enable standard programmes to be set up quickly, and the operator can over-ride the automatic sequence at any stage.

Finally, a warning note. American business has already produced electronic "failures"—the results of intro-

BUSINESS

ducing the new equipment without considering fully its application in relation to other clerical activities. An example is the case of a Detroit motor manufacturing firm which decided after three years' trial to give up electronic calculating equipment which it had been renting at a cost of 10,000 dollars a month. The equipment had been used almost entirely on one operation—scheduling—and while the necessary factor cards were being prepared, all other departmental functions were paralyzed for three days a month.

Returning to the old mechanical method meant that more time and operators were required, but in the long run the firm saved money.

Progress— and Price

Undoubtedly the scope of electronic data-processing machines will increase—although the rate at which progress is made will depend as much on economic factors as on technical ingenuity.

Already in use are "character-sensing" machines which "read" ordinary typewritten matter and convert it into punched cards, perforated paper tape, or simply into electrical pulses for further processing. Commercially, their use is limited at present to specialized operations like reading the serial numbers on cheques and other documents. But since a machine which can identify one line of type can—theoretically if not economically—read continuous matter, the possibility of being able to feed ordinary documents into an electronic accounting system cannot be dismissed altogether.

Whether a cheap "pocket-size" computer will eventually appear is an open question. But the more widespread use of germanium transistors will help to reduce the bulk of electronic equipment and increase its reliability. These tiny components—much smaller than miniature valves although able to perform many of the valves' functions—are still being developed and it is difficult to assess their full potentialities in this respect.

The mass-production of electronic calculators will present problems for many years. Ironically, perhaps, hand-soldering is at present the only satisfactory method of assembling the intricate circuits on which the reliability of these automatic machines depends—and manufacturers, wisely, are placing reliability before all other factors.

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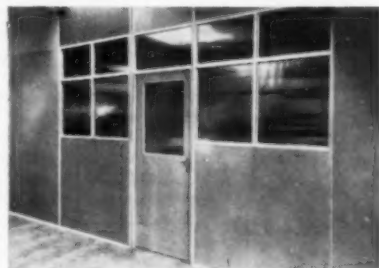
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MACHINE CONTROL

Continued from page 105

the equipment is necessary. Its components are shown schematically in an accompanying diagram while the photograph on page 102 indicates that, even to a layman, the "mock-up" version is not particularly formidable.

The principle is that each function of the machine is controlled by a separate "tuned" circuit which responds only to one frequency. These circuits are connected through "slave" relays to the machine's original solenoid-valves, all other electrical control gear (except the main hydraulic motor and starter) having been removed during the conversion. Individual frequencies are generated continuously by oscillator units.

When a button is depressed, an electrical feed of the correct frequency completes one of the tuned circuits (by closing a reed relay) and operates the slave relay which controls the appropriate solenoid valve in the machine.

Operating Sequence

The movement thus started continues for as long as the button is depressed. At the same time, the frequency itself is recorded on the tape. This means that whenever the tape is played back the frequency signal will automatically close the appropriate circuit and reproduce the original movement for the same period of time.

Where a number of machine movements have to take place simultaneously, the frequency signal corresponding to each of them is recorded on the one track, just as much more complex frequencies of an orchestra are intermingled on a tape recording without losing their identities. During playback, the reed relays sort these signals into the correct channels.

Before he starts to record a programme, the operator pre-sets the

hydraulic circuit to give certain rates of feed. Subsequently, he allows each depression of a button to "overrun" slightly the moment when the slide is arrested by a deadstop, thus making sure that the same degree of accuracy will be achieved during playbacks, irrespective of any variation in the viscosity of the hydraulic oil. The speed of the recording and playback unit is constant, and where the starting and stopping of an intermediate movement to a few thou. is not essential, the recorded signal alone can be relied on without using a deadstop.

The highest frequency used in this system is 500 cycles. This means that optimum results could be obtained from a much more simple type of tape recorder. Even a tape speed of one inch per second would be sufficient to record and reproduce operating signals satisfactorily, allowing a standard 2,000ft. reel of magnetic tape to run for nearly eight hours and to accommodate a large number of operating cycles.

A significant point is that the modification of the machine used in the demonstration set-up is actually a simplification: all limit switches and relays, and much of the original wiring, have been eliminated. Nor is it necessary for the control equipment to be so comprehensive as it is now. If a battery of machines were equipped with simple playback units (including the reed and slave relay circuits) it would be sufficient to provide only one master recording unit.

By plugging in the master unit, programmes could be recorded in all cases on the machine which would subsequently undertake the work. While it would be possible (and obviously more "efficient") to simulate programmes from the drawings, Alfred Herbert Ltd. feel that the results might not justify the cost of the additional equipment. Moreover, they attach considerable importance to the fact that the present arrangement allows the setter to take into account the characteristics of individual machines.

Recent experimental work has indicated that the system could be applied successfully to profiling and three-dimensional contouring. Also under consideration are methods of using the tape to control both machine functions and dimensions.

Meanwhile the company are concerned with means of exploiting the fact that the system can either be added to existing machines or incorporated economically in new machines designed specifically for this type of automatic control.

Xmas is Coming

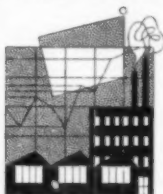
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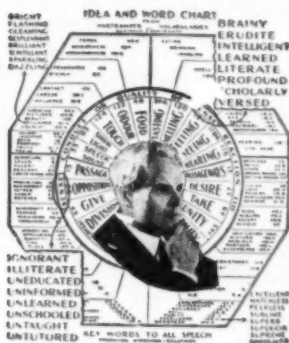
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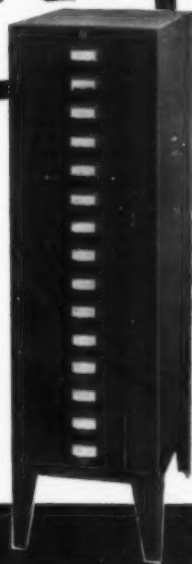
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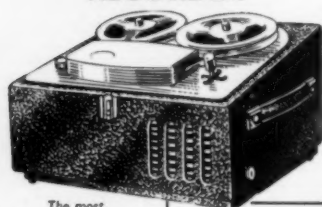
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JOB EVALUATION

Continued from page 86

Co-ordination: To co-ordinate the efforts of consultants and work study officers throughout the industry and to secure adequate dissemination of the latest information to them.

Information: To give instruction by lectures and circular bulletins to management and supervisory grades on the value and application of work study methods.

Publicity: Generally publicizing work study within the industry, with a view to stimulating interest among managements and operatives.

In line with these objectives, the advisory service now scrutinizes all schemes submitted to the association. In each case it is given a full description of the job, together with relevant output figures and the wages to be paid. Should any anomalies be suspected, further explanation may be called for before the scheme is finally approved.

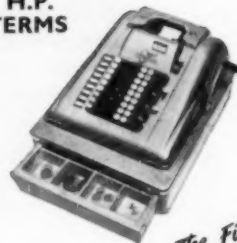
The first work study course for senior executives was started in September. It will be followed by talks and discussions for junior executives and the supervisory grades. These courses are intended primarily to foster an attitude receptive to work study. Parallel with them, information of a technical nature is being imparted to work study officers actively engaged in the industry, particularly in firms which no longer retain consultants. Here again, the aim of the advisory service is to achieve uniformity of approach throughout the industry on all matters within its scope.

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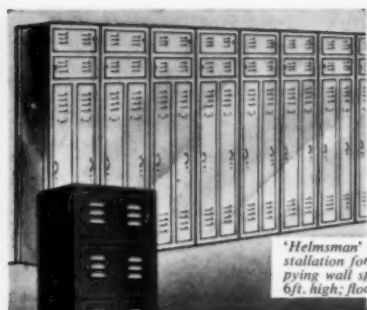
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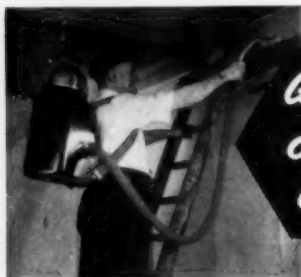


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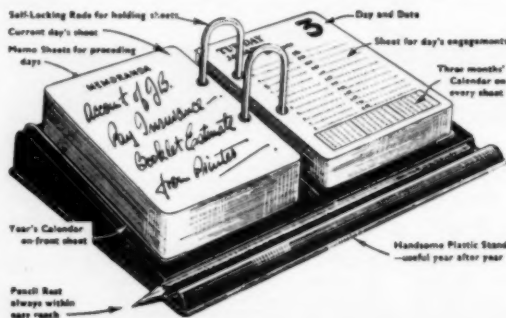
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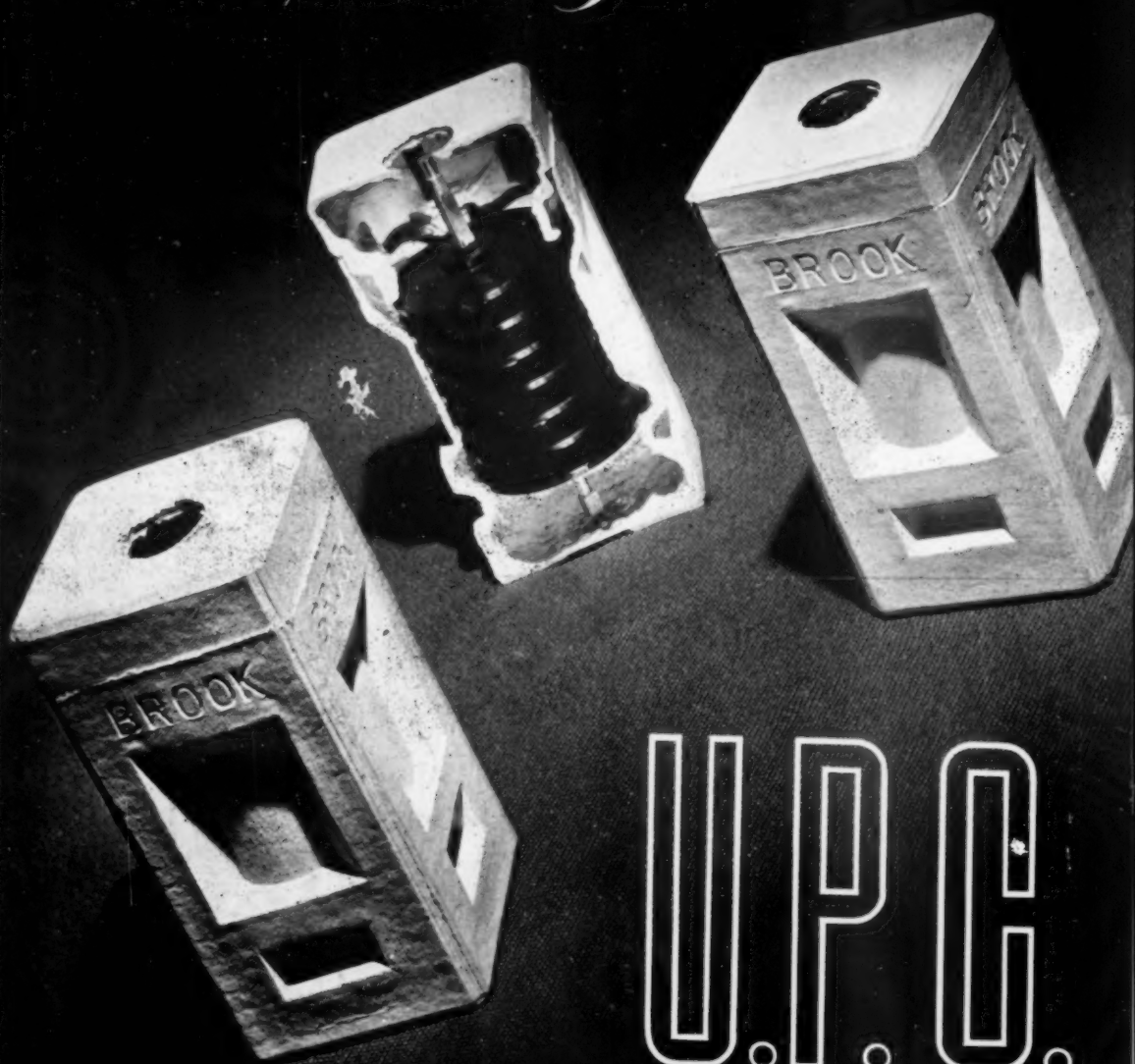
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